

Pharmacist Contribution to myHealth Portal

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This thesis is dedicated to my parents and family, for their unwavering support and love;
to my friends, for their constant encouragement;
and to my mentors, for their invaluable guidance throughout this journey.

Abstract

myHealth is a digital health platform in Malta that facilitates access to medical information for patients and healthcare professionals. Pharmacists currently lack direct access to this platform, limiting their role in integrated care.

The aim of this study was to evaluate perceptions of the myHealth platform and to explore opportunities to enhance pharmaceutical services through pharmacist integration. A validated bilingual questionnaire was distributed to healthcare professionals and the general public, with supplementary insights gathered from a focus group of eight healthcare professionals. The study was conducted in a community pharmacy setting.

Key outcomes included attitudes toward pharmacist access, usage patterns, and suggestions for platform enhancement. A total of 189 responses were collected: 37% from healthcare professionals and 63% from the public. Most respondents were female (78%), with the largest age group being 31–40 years (23%). Awareness of the myHealth platform was high (95%), with 84% understanding its services and 83% having used the portal. Only 28% had scheduled appointments via the system.

Support for pharmacist access was strong, with 84% agreeing it would improve medication management, care coordination, and reduce errors. Furthermore, 94% supported uploading pharmacy-based pharmaceutical services, such as blood pressure or glucose readings, to the portal to ensure a more comprehensive health record. A minority (16%) expressed concerns over privacy and data security.

Focus group discussions reinforced the role of myHealth as a bridge between primary and secondary care. Participants highlighted the benefits of enabling pharmacist access for medication reconciliation, adherence monitoring, and care continuity. Suggestions included introducing a user-friendly interface for older adults and expanding digital pharmaceutical services such as telepharmacy.

In conclusion, both patients and healthcare professionals supported expanding pharmacist involvement in myHealth. Integration could enhance medication therapy management, improve provider communication, and strengthen patient safety. Suggested developments such as telepharmacy and digital service documentation could address accessibility gaps, particularly for vulnerable populations. This evolution positions myHealth as a fundamental tool in delivering coordinated, high-quality care across healthcare settings.

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List of Abbreviations

CONvErGE	Connected Health Services for the Elderly through E-Governance
EAHP	European Association of Hospital Pharmacists
EHRs	Electronic Health Records
FIP	International Pharmaceutical Federation
GDPR	General Data Protection Regulation
HCP	Healthcare Professionals
HL7 FHIR	Health Level Seven – Fast Healthcare Interoperability Resources
NHS	National Health System
PGHD	Patient-Generated Health Data
POYC	Pharmacy of Your Choice
WHO	World Health Organisation

Chapter 1

Introduction

1.1 Background

Digital transformation in healthcare has significantly reshaped how patients and healthcare professionals (HCP) access and share clinical information. myHealth is a digital platform designed to facilitate access to patient health records, including blood tests, imaging, and appointment histories, as can be seen in figures 1.1 and 1.2. In Malta, the myHealth portal was initially launched in 2012 and expanded into a fully operational, publicly accessible platform by 2017. myHealth serves as a secure interface between patients and their general practitioners, enabling continuity of care between hospital and community settings (Bezzina et al., 2021).

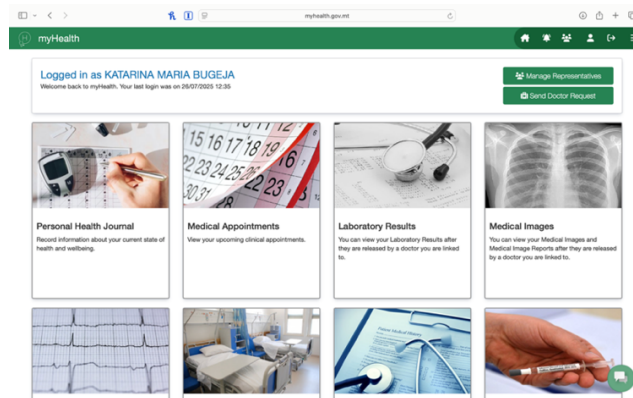


Figure 1.1 Screenshot of the myHealth portal homepage showing available services and features. Source: myHealth.gov.mt, accessed on 26 July 2025.

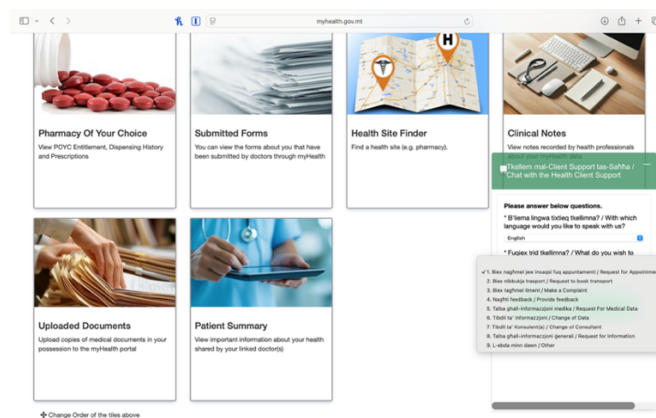


Figure 1. Screenshot of the lower section of the myHealth portal homepage and the Live Chat Support function. Source: myHealth.gov.mt, accessed 26 July 2025

The digital platform aims to empower patients through direct access to personal health data while simultaneously improving healthcare system efficiency by reducing paper-based processes and streamlining transitions of care. However, pharmacist access to myHealth remains restricted, limiting the pharmacist's ability to contribute fully to integrated care and safe medication management in both acute and chronic settings.

Several recent studies across Europe, Australia, and Canada highlight that the exclusion of pharmacists from shared electronic health records (EHRs) has contributed to medication safety risks, reduced continuity of care, and fragmented pharmaceutical service delivery. For example, in Australia, Hareem et al. (2024) reported that limited usability of EHRs and e-prescribing systems in community pharmacies led to delays in reconciliation, service duplication, and data-transmission errors. In Germany, Eickhoff et al. (2021) emphasised how fragmented information sharing limited pharmacists' effectiveness in chronic disease management. Kayyali et al. (2017) and Rau et al. (2024) both found that healthcare professionals across the United Kingdom and Germany, respectively, cited a lack of pharmacist integration into digital systems as a contributing factor to adverse drug events. Furthermore, a 2023 global review by do Nascimento et al. reinforced that the underutilisation of pharmacists in digital healthcare environments presents a recurring threat to safe pharmacotherapy.

Recent global trends also point toward the broader role of digital health in fostering patient autonomy and real-time access to clinical data. While patient access to EHRs has enhanced transparency and engagement, the absence of structured pharmacist access remains a critical gap. ShojaeiBaghini (2025) emphasised that adoption of digital prescribing and record systems depends not only on technical infrastructure but also on trust, usability, and pharmacist readiness, reinforcing the need to embed pharmacists

meaningfully within digital communication loops to improve adherence support, medication safety, and multidisciplinary care.

Van Kessel et al. (2022) expand the concept of digital health beyond technical and clinical outcomes to include patient empowerment, emotional wellbeing, and equitable healthcare access. This framing of digital wellbeing aligns with the objectives of platforms like myHealth, which aim to support patients through accessible, personalised records and enhanced service delivery.

In the Maltese context, digital healthcare innovation has followed a structured evolution. Starting with internal hospital systems in the 1990s, it advanced toward patient-facing interfaces with the 2012 launch of the myHealth portal. This initiative enabled access to blood test results, imaging, appointments, and vaccination records, marking a significant step toward improving care coordination through digital innovation. Azzopardi-Muscat and Sørensen (2019) emphasised that such initiatives must be accompanied by strategies to promote health literacy and equity, ensuring that all population groups benefit equally from digital transformation. Notably, the Connected Health Services for the Elderly through e-Governance (CONvErGE) project—a cross-border digital health initiative—sought to enhance interoperability, particularly for the elderly, by enabling the secure exchange of electronic prescriptions and patient summaries across European Union member states. These efforts reflect Malta’s strategic vision to align with European Union standards in digital health and integrated care.

1.2 The Role of Digital Health and Digital Innovation in Pharmacy

Digital health technologies have become an essential component of modern healthcare ecosystems, transforming how healthcare is delivered, monitored, and accessed. These technologies include mobile applications, telemedicine platforms, wearable sensors, and

EHRs, all of which support data-driven, patient-centred care. Mosa et al. (2012) conducted a systematic review identifying that digital health applications and smartphones enhance disease monitoring, self-management, and communication, while providing healthcare professionals, including pharmacists, with real-time access to references, diagnostic tools, and clinical guidelines.

The increased adoption of digital tools has been linked to improved medication adherence, symptom tracking, and chronic disease outcomes. Pharmacists are leveraging these platforms to deliver services such as remote medication reviews, chronic disease counselling, and virtual consultations (Aungst, 2021; Carlqvist et al., 2021). Artificial intelligence and mobile innovations have further enabled pharmacists to support clinical decision-making and develop personalised, disease-specific interventions (Lapão, 2016; Almeman, 2024). Lapão (2016) examined artificial intelligence-supported pharmacist interventions in Portugal, while Al Mazrouei et al. (2021) reported the successful implementation of virtual pharmacist services in the United Arab Emirates. Kharaba et al. (2022) highlighted pharmacists' supportive attitudes toward such expanded digital services despite persistent barriers. These studies demonstrate how digital platforms have expanded the pharmacist's role beyond traditional dispensing and into disease prevention, therapeutic monitoring, and population health initiatives.

The effectiveness of digital pharmacy models has also been observed in rural or geographically remote regions. For example, Tsai et al. (2020) conducted a global scoping review on the implementation of EHRs, drawing on 142 studies—mostly from the United States, but also from Europe, Asia, and the Middle East. Their analysis highlighted how EHRs can enhance efficiency, communication, and data accessibility, particularly in underserved settings, while also emphasising barriers such as interoperability challenges, insufficient training, and limited resources. Similarly, Abu Farha et al. (2024) explored

pharmacy-led mobile health solutions in Jordan, demonstrating their potential to overcome geographical barriers. Moreover, Krauss & Abraham (2022) and Osasu (2024) reported that pharmacist-led interventions in community pharmacies can reduce inequalities in healthcare access, strengthen chronic disease support, and minimise medication-related risks, reinforcing the need for pharmacist integration into a broader digital infrastructure.

This growing role is echoed in global policy recommendations. The International Pharmaceutical Federation (FIP) advocates for pharmacist access to EHRs, integration of telepharmacy into routine practice, and stronger pharmacist involvement in digital health policy. Mantel-Teeuwisse et al. (2020) also emphasise that pharmacy education must adapt to digital transformation. The proposed “Fourth Generation” model promotes a people-centric, technology-enabled learning environment, preparing graduates for roles in digital medication safety, remote counselling, and personalised care delivery.¹

As the digital health landscape evolves, pharmacists are increasingly seen as key contributors to national digital health strategies. Ait Gacem et al. (2025) identified interoperability gaps, insufficient training, and lack of system integration as persistent barriers, highlighting the necessity of involving pharmacists in the development of interoperable digital systems and the implementation of training initiatives that support digital transformation in pharmacy practice. Blandford et al. (2018) advocated for user-centred, co-designed digital health to improve patient engagement and self-management,

¹ International Pharmaceutical Federation (FIP). FIP Development Goals: Supporting the transformation of the pharmacy profession [Internet]. The Hague (Netherlands): FIP; 2021 [cited 2025 Jul 5]. Available from: <https://www.fip.org/fip-development-goals>

and Sumner et al. (2024) showed that co-design of remote-monitoring tools enhances patient-centredness and reduces use barriers. This approach also supports pharmacist-led remote services by improving communication and adherence (Park et al., 2022).

Additionally regulatory bodies have acknowledged the importance of pharmacist inclusion in digital transformation. The European Association of Hospital Pharmacists (EAHP) has called for the integration of electronic prescribing, EHRs, and regulation of digital health applications to ensure patient safety and data protection (Moss et al., 2019). Notably, the EAHP supports hospital pharmacist involvement in the design, evaluation, and implementation of digital health tools to align them with clinical standards and improve healthcare delivery.

The strategic role of pharmacists in data-driven care has also been highlighted in health innovation literature. Pedersen and Sudzina (2023) found that citizen perceptions of digital health depend heavily on underlying health risks, and that demand is strongest for solutions that improve data sharing, integration, and care coordination. Their findings reinforce the need to embed pharmacists into digital infrastructures to support chronic disease prevention, treatment monitoring, and personalised service provision.

Moreover, several studies reinforce that pharmacist-led digital interventions are especially valuable for managing long-term conditions. Marcolino et al. (2018) reported that digital applications and remote monitoring significantly improved outcomes in patients with chronic diseases, highlighting the need for pharmacist participation to optimise medication use and continuity of care. Ilkic et al. (2023) found that pharmacists and pharmacy students increasingly engage with digital health apps, recognising their potential to support person-centred care, medication adherence, and patient education, while also identifying challenges around usability and data privacy. Antonio et al. (2020),

in an umbrella review, found moderate evidence that effective use of patient portals improves self-management, medication adherence, and communication with healthcare professionals. These findings provide further support for pharmacist inclusion in platforms like myHealth, particularly in chronic care models.

In addition to clinical services, pharmacists are increasingly engaged in delivering digital therapeutics, evidence-based, software-driven interventions used to prevent, manage, or treat medical conditions. Madanian et al. (2023), in a review of patients' perspectives on digital health tools, highlighted the importance of ensuring that these technologies are integrated into care in ways that empower patients, enhance self-management, and address barriers such as digital literacy and privacy concerns. Their findings suggest that pharmacists, through their roles in patient counselling and therapeutic optimisation, are well-positioned to bridge these gaps and support the effective adoption of digital therapeutics. Parajuli et al. (2022) also emphasised the expanding role of digital health in public health in Nepal, identifying both opportunities and challenges in using digital platforms to improve service accessibility and chronic disease management. These findings align with global calls to modernise pharmacy practice through the implementation of mobile health, telepharmacy, and electronic medication review services.

The expansion of telehealth has also supported the scalability of pharmacist-led services. Ibrahim et al. (2021) showed that telepharmacy, implemented across community pharmacies, improved patient access and reduced several dispensing error categories. Campbell et al. (2021) further demonstrated the value of telepharmacy in acute care contexts, where remote pharmacists supported freestanding emergency departments by providing medication safety checks, clinical interventions, and patient counselling. Complementing these findings, Unni et al. (2021) reported that

telepharmacy enabled remote medication therapy management, patient education, and chronic disease support, proving particularly valuable during public health emergencies and in rural or resource-limited settings.

1.3 Evolution and Potential of Pharmaceutical Services

Pharmaceutical care has undergone significant transformation over the past decades, evolving from a product-oriented role centred on medication supply to a service-oriented model focused on patient-centred care. This evolution has expanded the pharmacist's responsibilities to include medication therapy management, chronic disease support, adverse drug reaction monitoring, public health outreach, and patient education. Henman et al. (2024) emphasised that these expanded services are essential to ensuring therapeutic appropriateness, reducing drug-related hospitalisations, and improving overall patient quality of life.

Community pharmacies have emerged as accessible and trusted points of care within the healthcare system. They now routinely offer structured services such as medication reviews, minor ailment schemes, vaccination programmes, smoking cessation support, point of care testing (such as urinalysis and blood pressure monitoring) and health promotion initiatives. This shift reflects a broader recognition of the pharmacist's clinical role within integrated, multidisciplinary care teams.

Digital integration has proven especially valuable in managing patients with multimorbidity and polypharmacy, where coordination of care is critical. Cobelli and Chiarini (2020) reported that pharmacist access to shared electronic systems improved care communication, particularly in remote areas, by enabling direct interaction with prescribers and care teams. Almeman (2024) highlighted that the ongoing digital transformation of pharmacy, including the expansion of telepharmacy and online

platforms across Europe and the Middle East, is reshaping service delivery and enabling pharmacists to provide virtual care that supports continuity of therapy. Furthermore, Fanizza et al. (2018) demonstrated that pharmacist-led medication reviews integrated with health information exchange systems significantly reduced hospital readmissions, reinforcing the utility of digital platforms in enhancing transitions of care and preventing adverse outcomes.

Evidence continues to build in favour of expanding digital pharmaceutical care. Abu Fahra et al. (2024) explored Jordanian pharmacists' readiness for telepharmacy, highlighting its role in supporting digital care pathways, particularly in medication optimisation and adherence monitoring for patients with chronic illnesses. The COVID-19 pandemic further accelerated the adoption of telepharmacy and remote clinical services. As noted by Bukhari et al. (2020), pharmacists played an essential role during the pandemic in ensuring medication continuity, delivering virtual counselling, and participating in digital medication safety monitoring programmes.

These findings support the integration of pharmaceutical services into digitally enabled healthcare models, emphasising the need for long-term investment in pharmacist-led, technology-driven care. Fung et al. (2020), in a mixed-methods study of Hong Kong pharmacists, identified enablers for pharmacist integration such as a centralized, regulator-led electronic product information system, standardized formats, role-based access (professional vs public views), and rapid, up-to-date information to support clinical work. They also highlighted that successful adoption requires system-level coordination, governance, and resources, alongside attention to data security, legal frameworks, costs, and digital literacy.

Recent evidence from the United Kingdom reinforces this trend. Park et al. (2022) found that pharmacist-led digital health interventions, such as EHR integration, clinical alerts,

and automated adherence tools, significantly improved medication safety and chronic disease outcomes. However, they also noted challenges in achieving full integration, citing poor interoperability between pharmacy systems and broader healthcare platforms as a key limitation. These insights further validate the need to optimise digital connectivity within pharmaceutical services to enhance their contribution to primary care.

Together, these findings emphasise the growing potential of pharmaceutical care in digitally integrated systems. As the pharmacy profession continues to shift toward proactive, clinical service provision, healthcare systems must prioritise pharmacist access to digital platforms, shared records, and collaborative care protocols. Only through strategic integration can the full value of pharmaceutical services be realised in improving population health outcomes and enhancing continuity of care.

Despite substantial evidence demonstrating the clinical and economic benefits of pharmacist-led interventions, their integration into healthcare systems, particularly within digital infrastructures, remains fragmented and inconsistent. A systematic review by de Barra et al. (2018) highlighted that pharmacist-delivered services can improve certain health outcomes, particularly in blood pressure management. However, the review also underscored persistent barriers such as fragmented policy frameworks and limited access to EHR, which significantly constrained implementation on a national scale. These observations are strongly echoed in the Maltese context, where the lack of pharmacist access to digital health platforms like myHealth continues to impede the profession's ability to deliver fully integrated, patient-centred care. As the pharmacist's role increasingly encompasses chronic disease management, therapeutic optimisation, and collaborative clinical decision-making, effective integration requires more than just technological infrastructure—it necessitates a cohesive framework of interprofessional

collaboration, policy alignment, and secure, role-appropriate access to patient data. Addressing these barriers, both locally and internationally, is essential to ensure that pharmacists are embedded meaningfully into digitally enabled models of care, allowing them to contribute proactively to improved healthcare outcomes.

1.4 Barriers to Implementation and System Limitations

While the benefits of pharmacist integration into digital health platforms are well recognised, several persistent barriers hinder full implementation. Among the most frequently cited concerns are patient data privacy, lack of standardised digital training, and technological exclusion, particularly among older adults (Kayyali et al., 2017; Wernhart et al., 2019). Although data protection regulations across the European Union provide a robust legal framework, including the General Data Protection Regulation (GDPR), fears of data breaches and unauthorised access remain a significant deterrent to both users and healthcare professionals (Adjekum et al., 2018).

Pharmacists themselves often report limited confidence in using digital health technologies. This hesitation is frequently attributed to inadequate formal training, inconsistent access to digital systems, and uncertainty about legal rights and responsibilities regarding patient data (Hole et al., 2021; Rau et al., 2024). These challenges are compounded by infrastructural limitations and inconsistent system availability, particularly in smaller healthcare settings. In the Maltese context, these barriers may be further intensified by limited national-level investment in pharmacist training on digital health platforms, as well as restricted access to the country's myHealth system.

Digital literacy disparities (especially among older individuals) remain another barrier to effective engagement with digital health platforms. Kayyali et al. (2017), alongside

findings from this study, emphasised the need for targeted patient education and intuitive user interfaces to support equitable access across all population groups. These challenges are particularly relevant in Malta, where generational differences in technology adoption have been observed.

Another emerging challenge involves the use of patient-generated health data (PGHD), such as self-monitored blood pressure or glucose readings. While this type of data has the potential to enhance real-time monitoring and empower patient involvement, healthcare professionals often approach it with caution. Nundy et al. (2014) found that clinicians viewed PGHD as a useful supplement to care but still preferred validation through formal diagnostics. This perspective is echoed by a more recent study Jiang et al. (2025), which concluded that PGHD is most impactful when seamlessly integrated into clinical workflows. Mojab et al. (2025) further underscored the importance of equipping pharmacists with practical skills to support patients in using digital health-driven devices such as continuous glucose monitors and insulin pumps, ensuring that PGHD is translated into meaningful care interventions. In Malta, the lack of pharmacist access to platforms capable of receiving and actioning PGHD limits its practical use in pharmacy-led chronic disease management.

Plastiras and O'Sullivan (2018) proposed a standardized information model to support the exchange of PGHD and observations of daily living within electronic health records. Such frameworks are essential to ensure interoperability, consistency, and trust in digital systems, while enabling pharmacists and other healthcare professionals to integrate patient-contributed data into clinical decision-making.

Access to comprehensive patient information remains another persistent barrier to pharmacist-led care. Kosari et al. (2020) reported that pharmacists frequently experience delays or errors in clinical decision-making due to lack of access to medical histories and

laboratory results, particularly in community settings where such information is essential for managing complex regimens. The authors concluded that real-time access to clinical data is vital to ensure safe, effective, and accountable pharmaceutical care.

Similarly, Ibrahim et al. (2022) found that pharmacists in the United Arab Emirates recognised the value of telepharmacy in managing chronic conditions, yet adoption was constrained by inadequate training, time pressures, and limited digital infrastructure. These structural limitations mirror the challenges reported by pharmacists in Malta and underscore the need for educational reform and investment in digital capacity to enable meaningful participation.

A systematic review by Ait Gacem et al. (2025) further supports this view, identifying poor usability, limited integration with clinical workflows, concerns around data privacy, and legal/infrastructural constraints as significant barriers to digital health adoption among pharmacists across diverse regions. The authors emphasize that meaningful digital transformation requires robust operational guidance, legal safeguards, interoperability standards, and targeted professional training—factors still underdeveloped in many healthcare systems globally.

Griffiths et al. (2018) highlighted that digital communication tools need to be carefully designed and supported with user-centered education, particularly for populations with limited digital literacy. These issues were reflected in the Maltese study population, where age and education level influenced use of the myHealth portal and attitudes toward digital health. A narrative review by Viegas et al. (2022), conducted under the International Pharmaceutical Federation, identified systemic challenges that closely mirror the Maltese experience. Key barriers included limited interoperability between systems, inconsistent data quality, and resistance from clinicians due to workflow disruption and interface complexity. The authors stressed the importance of co-design and

early stakeholder engagement in system development to promote acceptance and long-term usability, principles equally relevant to the local context.

Cresswell et al. (2020) highlighted that while expanding access to EHRs can enhance care coordination and clinical efficiency, ethical concerns surrounding data governance and patient consent continue to constrain broader professional access. In Malta, these concerns have been cited as key reasons for maintaining pharmacist exclusion from systems like myHealth, despite growing support for their inclusion.

Kharaba et al. (2022) noted that community pharmacists are uniquely positioned to promote digital health literacy and guide patients in navigating portals, apps, and digital tools. Their accessibility and existing relationships with patients make them valuable intermediaries, especially in populations with limited experience or confidence in using technology. In Malta, this role is particularly important, given observed disparities in public engagement with myHealth.

Farghali and Borycki (2024) identified persistent workflow disruptions and new types of errors emerging with e-prescribing, underscoring the importance of pharmacist training in digital competencies such as data interpretation, secure communication, and system navigation. These findings highlight that preparedness in both undergraduate education and continuing professional development is essential for pharmacists to participate safely and effectively in digitally enabled care delivery.

1.5 Rationale for the Study

As healthcare systems move toward more patient-centred, digitally enabled models, pharmacists must be empowered to contribute through access to shared health records. Pharmacists play a vital role in optimising pharmacotherapy, supporting adherence, detecting drug-related problems, and managing chronic conditions. However, the current

lack of pharmacist access to Malta's national digital health platform, myHealth, represents a significant gap in coordinated care and limits the potential impact of pharmacy-based interventions.

This study builds upon prior work that explored digital health adoption and public engagement and now shifts focus toward evaluating the feasibility and value of extending access to pharmacists. Evidence from international literature supports the integration of pharmacists within digital care pathways. In particular, pharmacist-led telepharmacy and digital counselling interventions have been associated with improved medication adherence, better therapeutic outcomes, and reductions in adverse drug events (Al Mazrouei et al., 2021; Kharaba et al., 2022; Hettinger et al., 2023).

Given the increasing complexity of patient care (often involving polypharmacy and multimorbidity) and the documented success of digital integration in other countries, it is both timely and necessary to assess how myHealth can evolve to support pharmaceutical services in Malta. By examining both professional and public perspectives, this study aims to generate locally relevant evidence that can inform future policy, improve digital infrastructure planning, and support the broader digital transformation of pharmacy practice.

1.6 Aims and Objectives

This study aimed to evaluate the perceptions of healthcare professionals and the general public regarding the myHealth portal, its potential to support pharmaceutical services, and the feasibility of expanding pharmacist access. It examined awareness, usage, and satisfaction with the platform, and assessed the level of stakeholder support for pharmacist integration. The study also investigated perceived benefits, challenges, and concerns related to data privacy and system security. Furthermore, it explored how

pharmaceutical services, such as telepharmacy, medication reviews, and digital adherence support, could be expanded through the myHealth system.

Chapter 2
Methodology

2.1 Study Design

This study employed a mixed-methods research design to evaluate engagement with the digital health portal myHealth in Malta and assess public and professional perspectives on the potential integration of pharmaceutical services within the platform. Mixed-methods research combines quantitative and qualitative approaches, enabling a more holistic understanding of the research question. This design was selected to capture both the breadth of opinions from a diverse population and the depth of insight from experienced healthcare professionals.

The quantitative phase consisted of a structured, bilingual questionnaire (Appendix 2) distributed both online and in physical form. This approach was chosen to ensure wide demographic coverage and inclusivity of individuals with varying levels of digital literacy. The qualitative phase followed preliminary quantitative analysis and comprised a focus group discussion with healthcare professionals from varied disciplines within the health sector. This session provided more detailed, experience-based reflections on the operational, ethical, and systemic implications of pharmacist integration into digital health systems such as myHealth.

An overview of the study workflow is presented in Figure 2.1, which outlines the sequential stages of study design, questionnaire distribution, focus group implementation, and data analysis.

By triangulating data from both phases, the study aimed to produce findings that were not only statistically representative but also grounded in the lived experiences and professional insights of healthcare stakeholders. This methodological approach enhanced both the reliability and relevance of the study and facilitated a richer interpretation of stakeholder attitudes, expectations, and perceived challenges.

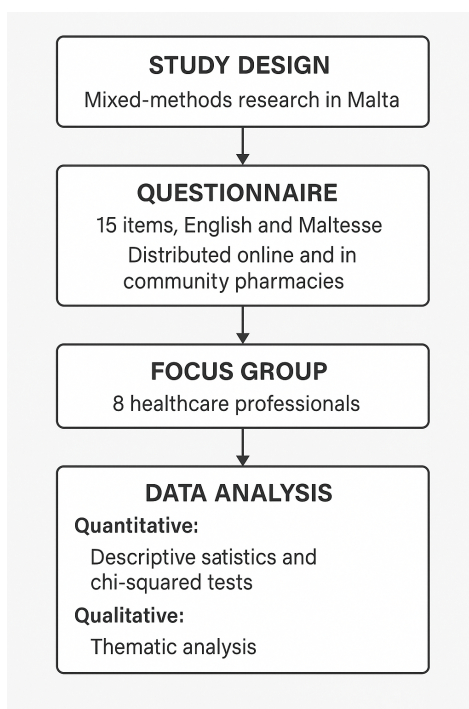


Figure 2.2 Study Overview

2.2 Literature Review

A preliminary literature review was conducted to guide the study design and instrument development. The review focused on existing frameworks related to EHRs, pharmacist involvement in digital health systems, interdisciplinary collaboration, and barriers to implementation. Relevant literature was identified using academic databases including HyDi, PubMed, and Google Scholar. Search terms included combinations of: “pharmacist access to health records,” “digital health platforms,” “telepharmacy,” “myHealth Malta,” and “interdisciplinary pharmaceutical care.” Only peer-reviewed articles in English published between 2012 and 2025 were included to ensure relevance and recency.

2.3 Ethical Approval

Ethical approval for the study was obtained from the University of Malta Research Ethics Committee prior to the commencement of each phase. For Phase 1, which involved the

administration of a structured questionnaire (Appendix 2) to members of the public and healthcare professionals, the ethics submission included a detailed protocol, a participant information section prior to the questionnaire, and a bilingual version of the questionnaire in English and Maltese. Approval was granted under reference MED-2024-00045 (Appendix A.1).

For Phase 2, which involved a qualitative focus group discussion, a separate ethics application was submitted, including the focus group guide, consent forms, participant information sheets, and transcript release documentation. This submission was reviewed and approved under reference MED-2025-00004 (Appendix A.2).

All participants in both phases were required to give informed consent prior to participating in the study. Voluntary participation, confidentiality, and the right to withdraw at any time were clearly communicated to all participants.

2.4 Questionnaire Development, Validation, and Reliability Testing

The questionnaire (Appendix 2) used in Phase 1 consisted of 15 items and was developed using the Google Forms platform. It was made available in both English and Maltese to ensure inclusivity and accessibility across Malta's linguistically diverse population. The questionnaire collected demographic information and assessed respondents' awareness, usage patterns, and satisfaction with the myHealth platform. It also included questions designed to explore attitudes toward pharmacist access to digital records and the potential for expanding pharmaceutical services through myHealth.

To establish content validity, a panel of six individuals, comprising two pharmacists, two non-pharmacist healthcare professionals, and two laypersons from the general public, was invited to review the questionnaire. Panel members evaluated the draft instrument for

clarity, appropriateness, and relevance. Based on their feedback, several items were refined to improve readability, cultural sensitivity, and neutrality of wording.

To assess reliability, the questionnaire underwent a test–retest validation procedure. A pilot sample of ten individuals completed the questionnaire twice, with a 15-day interval between submissions. The stability of their responses was compared using item-level analysis to detect inconsistencies. Minor adjustments in question phrasing were made to improve internal consistency and reduce ambiguity.

2.5 Sampling and Data Collection

A hybrid methodology was used to collect data from a wide demographic. For the quantitative phase, the questionnaire was distributed exclusively via social media platforms. This included sharing the Google Forms link through personal networks, public groups, and community pages on platforms such as Facebook and Instagram. This approach provided broad accessibility and allowed the study to reach participants across various age groups, professional backgrounds, and localities within Malta. The questionnaire remained open for a period of six months, during which voluntary responses were collected anonymously.

To complement the survey findings, a focus group discussion was held with healthcare professionals. Participants were selected using purposive sampling to ensure diversity in experience and discipline. The combination of broad digital reach and targeted professional input supported the study’s goal of integrating both general and specialised perspectives.

2.6 Focus Group Discussion

Following the completion of the questionnaire phase, a 60-minute focus group discussion was held to explore in greater depth the perspectives of healthcare professionals regarding pharmacist integration into the myHealth platform. A purposive sampling strategy was used to recruit eight participants, including pharmacists, general practitioners, and nurses with experience in both community and hospital care. Participants were selected based on their prior engagement with digital health technologies and willingness to contribute diverse viewpoints.

The discussion was guided by a semi-structured interview framework, which allowed for consistency across topics while also providing flexibility to explore unanticipated themes. Core topics included perceived benefits and risks of pharmacist access, experiences with data sharing in clinical practice, collaborative care models, and system usability.

With the participants' consent, the session was audio-recorded and transcribed verbatim. All identifying information was removed from the transcript to maintain confidentiality. The focus group was conducted in a neutral, private setting conducive to open dialogue, and participation was entirely voluntary.

2.7 Data Analysis

2.7.1 Quantitative Data

Data from the questionnaire was exported from Google Forms into IBM SPSS Statistics version 29 for analysis. Descriptive statistics, including frequencies and percentages, were used to summarise participant demographics and response patterns. To examine associations between participant characteristics (such as age group, gender, or professional role) and survey responses (such as support for pharmacist access or

frequency of myHealth use), inferential statistical tests were applied. Pearson's Chi-square test was used where assumptions of minimum expected cell counts were met; otherwise, Fisher's exact test was used. A p-value of less than 0.05 was considered statistically significant.

2.7.2 Qualitative Data

Qualitative data from the focus group transcript and open-ended questionnaire responses was analysed using manual thematic analysis. The transcript was reviewed line-by-line, and initial codes were applied to segments of text considered meaningful or thematically relevant. A structured and consistent coding process was followed to ensure the credibility and transparency of the analysis.

Following the initial coding phase, individual codes were grouped into broader, higher-order themes that captured the recurring concepts and sentiments expressed by participants. One of the most prominent themes was the perceived benefits of pharmacist access to myHealth, including improved medication reconciliation, enhanced patient adherence monitoring, and more consistent continuity of care. Another recurring theme related to data protection concerns, with participants expressing apprehension about patient confidentiality, the potential misuse of information, and the necessity for audit trails to track access. The focus group also revealed opportunities for collaborative practice, particularly the potential for enhanced communication between pharmacists and physicians, the development of shared care models, and the expansion of pharmacists' roles in clinical documentation. In addition, system limitations and usability issues emerged as a notable theme, including difficulties with platform navigation, the need for structured user training, and possible workflow disruption.

These thematic findings were subsequently triangulated with the quantitative survey results to produce an integrated interpretation of the study's outcomes. For instance, widespread survey agreement regarding concerns over information security corresponded with the qualitative emphasis on protective safeguards and professional education. This alignment of qualitative insights and quantitative trends contributed to the robustness of the overall findings and provided a stronger foundation for the subsequent discussion and recommendations outlined in the thesis.

Chapter 3

Results

3.1 Quantitative Results

The quantitative findings of this study were derived from a structured 15-item questionnaire (Appendix 2) disseminated both online and within community pharmacies across the south of Malta. A total of 189 valid responses were obtained and analysed using descriptive statistics, with results illustrated through graphs and tables for clarity. This section presents key results related to respondent demographics, awareness and usage of the myHealth platform, attitudes toward pharmacist access, and user perspectives on potential platform enhancements.

3.1.1 Demographic Characteristics

Among the 189 respondents, 62.4% identified as female and 37.6% as male. The distribution by age group showed that 23% were aged 31–40, 22% were aged 18–25, and another 22% were aged 41–50. Smaller proportions were reported in the 26–30 (6%), 51–60 (14%), and 60+ (13%) age bracket categories (table 3.1).

Respondents represented a wide range of occupational sectors. Healthcare professionals comprised the largest group (38.1%), followed by students (15.3%) and housewives (13.2%). Other occupational backgrounds included administrative roles, educators, pensioners, and those from various non-health-related professions. This diversity allowed for a broad understanding of how different segments of the population perceive and engage with the myHealth platform (figure 3.1).

Table 3.1 Age and gender distribution (N=189)

Age Group	N= 189
18-25	42 (22%)
26-30	11 (6%)
31-40	43 (23%)
41-50	42 (22%)
51-60	26 (14%)
60+	25 (13%)
Females: 147 (78%)	
Males: 42 (22%)	

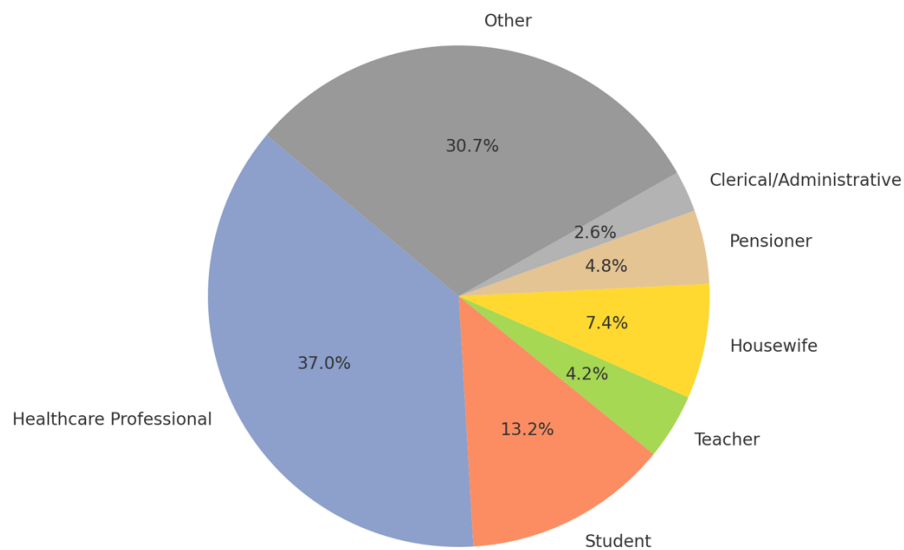


Figure 3.1 Occupation (N=189)

3.1.2 Awareness and Familiarity with myHealth

When asked whether they had heard of the myHealth platform, 95% of respondents reported awareness, while 5% indicated they had never heard of it (Table 3.2).

Among those who were aware of the platform, the degree of familiarity varied. The majority reported that they had heard of myHealth but had never used it. Only a small proportion were frequent users. Further analysis will detail the breakdown of users by frequency and explore associations with occupation and age group.

A comparison of awareness levels across occupational groups is illustrated in Figure 3.2. Healthcare professionals demonstrated higher awareness of the myHealth platform compared to laypersons. Among the healthcare professional group, nearly all respondents reported having heard of myHealth, whereas a small proportion of laypersons indicated unfamiliarity with the portal. This discrepancy may reflect greater exposure to digital health systems among professionals working within the healthcare sector. Nonetheless, overall awareness was high across both groups, supporting the platform’s national reach and visibility.

Among respondents who had previously used the platform, perceptions of simplicity were also explored. As shown in figure 3.3, most users rated the system between 1 (very simple) and 3 (neutral), indicating that the platform was generally perceived as straightforward to use. However, a smaller proportion of respondents selected ratings of 4 or 5, reflecting that some users encountered difficulties when navigating the portal.

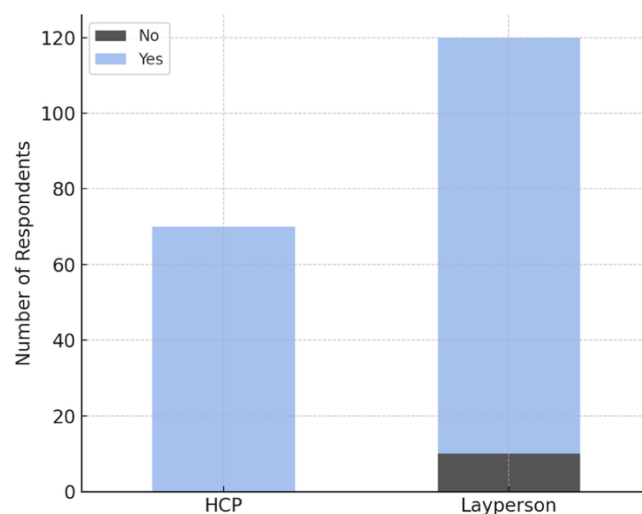


Figure 3.2 Awareness of myHealth based on healthcare professional background (N=189)

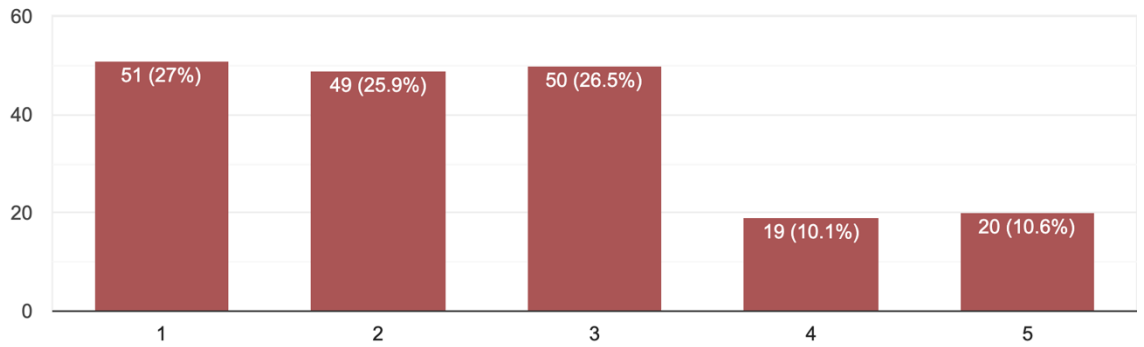


Figure 3.3 Respondents' ratings of how simple the myHealth platform was to use, where 1 = very simple and 5 = very difficult (N = 189).

3.1.3 Perspective on Pharmacist Access and Data Sharing

A total of 84% of respondents agreed that pharmacists should have access to patient health information through the myHealth platform (table 3.2). Support for pharmacist access was noted across all occupational categories, and the relationship between occupation and support was observed to approach statistical significance ($p = 0.0981$), based on Chi-square testing.

When participants were asked about their willingness to have pharmacy-based readings, such as blood pressure or glucose levels readings, uploaded to the platform, 94% expressed agreement (table 3.2). Among those who had undergone such testing, most agreed to the inclusion of these results in their digital records. However, willingness to upload health data was not significantly associated with prior use of the portal ($p = 0.6323$). Additionally, only 17% of respondents reported ever sharing medical test results with a pharmacist, and no statistically significant association was found between gender and this behaviour ($p = 0.1620$).

Table 3.2 Awareness, Usage, and Perspectives on Development of myHealth Portal (N = 189)

Question	Yes (n)	Yes (%)	No (n)	No (%)
Heard of myHealth	180	95%	9	5%
Know what myHealth provides	159	84%	30	16%
Used myHealth before	157	83%	32	17%
Received appointments via myHealth	53	28%	136	72%
Should pharmacist have access to myHealth data?	159	84%	30	16%
Willingness to have pharmaceutical results added to myHealth*	129	94%	8	6%

*Based on a subgroup of n=137 respondents who were eligible to answer this question.

3.1.4 Demographic Factors Influencing Use and Preferences

Several demographic variables were explored in relation to myHealth platform usage and attitudes toward data entry. Age group was found to be significantly associated with use of the platform ($p = 0.0222$), with younger respondents (18–30) reporting lower usage than older age groups. A statistically significant relationship was also found between age and willingness to enter self-monitored data into the platform ($p = 0.008$), with younger participants again being less likely to indicate a willingness to do so.

Importantly, age was also significantly associated with respondents' perception of how simple the platform was to use. Younger respondents (18–30 years) were more likely to rate the system as simple (ratings 1–2), whereas older adults, particularly those aged 60 years and above, reported greater difficulty, with a higher proportion selecting ratings of 4–5. This relationship was confirmed through Chi-square testing, which indicated a

statistically significant association between age group and perceived simplicity ($\chi^2 = 37.16$, $df = 20$, $p = 0.011$). The distribution of responses across age categories is illustrated in Figure 3.4, which shows that while simplicity ratings clustered at 1–2 among younger respondents, older participants displayed a notable shift toward higher difficulty ratings. Gender was not found to be significantly associated with use of the myHealth portal ($p = 0.533$), suggesting similar usage patterns among male and female respondents. Overall, while age appeared to influence both usage and engagement with health data input, gender did not emerge as a significant factor in these areas.

Of those who had blood pressure or glucose readings taken at a pharmacy, 94% were willing to have these results uploaded to myHealth. However, there was no significant association between previous use of the portal and willingness to upload such data (Fisher’s exact test, $p = 0.6323$).

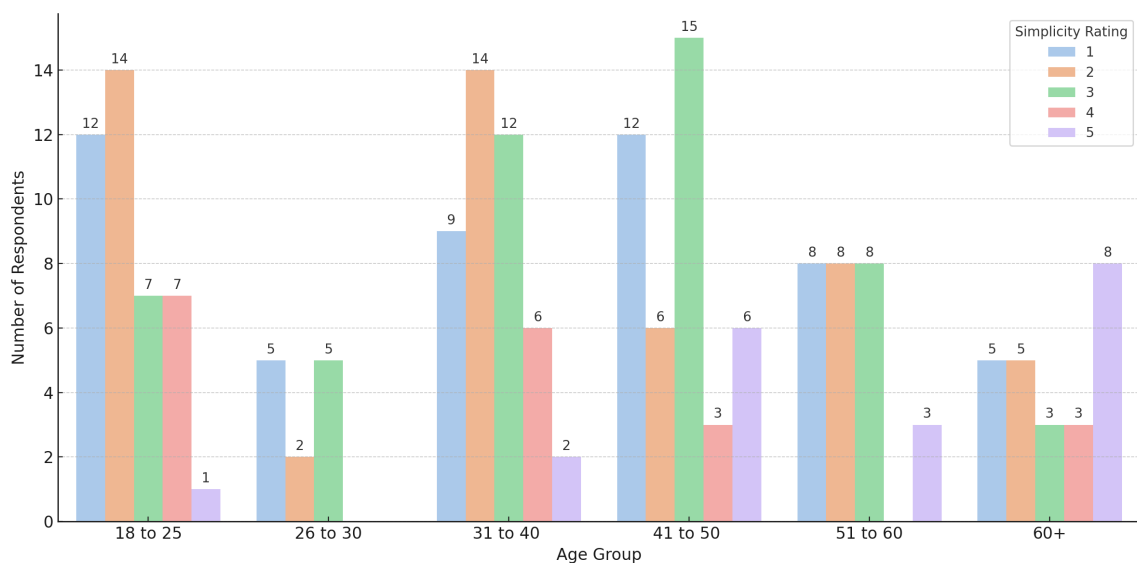


Figure 3.4 Distribution of simplicity ratings for the myHealth platform by age group (1 = very simple, 5 = very difficult; N = 189).

3.1.5 Suggestions for Improving the myHealth Platform

The final item in the questionnaire invited respondents to provide open-ended suggestions regarding how the myHealth portal could be improved. While a considerable number of

respondents left this section unanswered, a range of common themes were identified among the completed responses.

Several participants commented on technical aspects of the platform. The most frequently mentioned concern was the delay in uploading laboratory and diagnostic results. Respondents noted that it often took multiple days for results to become visible on the platform and suggested that reducing these upload times would make the system more effective in day-to-day care.

Another theme focused on communication features. Some respondents proposed the introduction of a secure live chat or messaging tool within myHealth to enable patients to contact healthcare professionals directly. This was mentioned by various participants as a way to facilitate follow-up after appointments or to request clarification regarding prescriptions and test results.

The portal's user interface was also a topic of concern. A number of respondents highlighted difficulties experienced by elderly users or individuals unfamiliar with digital technologies. These comments were often accompanied by suggestions to make the interface more intuitive, including the use of clearer menus, simplified navigation, and step-by-step instructions for key functions. Others proposed the development of a mobile application that could replicate the features of the web-based version in a more accessible format.

Further suggestions focused on expanding the platform's functionality. Some participants recommended the addition of prescription tracking, automatic reminders for medication or appointments, and integration of educational content. Others expressed interest in being able to view a consolidated medication history or receive notifications when new information was added to their profile.

While responses to this open-ended question were varied in detail and frequency, the suggestions consistently centred around improving the platform's speed, usability, and engagement features. The comments were summarised and grouped according to the areas mentioned above for reporting clarity.

3.2 Qualitative Findings – Focus Group Discussion

To complement the quantitative data, a focus group discussion was conducted with eight healthcare professionals comprising pharmacists, general practitioners, and nurses. This session aimed to elicit in-depth perspectives on the potential integration of pharmacists into the national myHealth platform. The dialogue yielded several key themes, reflecting both enthusiasm for reform and concern about existing barriers. Thematic analysis was performed manually, with recurrent patterns extracted from participant input and triangulated with survey findings to ensure analytical coherence.

3.2.1 Current Use and Perceived Limitations of myHealth

Participants described differing levels of usage of the myHealth portal in clinical practice, with usage patterns varying according to setting. Community-based professionals, such as general practitioners and community pharmacists, reported moderate engagement with the platform, primarily for viewing past investigations, medication histories, and imaging results. In contrast, hospital-based professionals reported limited use, as institutional systems such as iSOFT were more heavily relied upon for integrated patient management.

One commonly voiced concern was the delay in the availability of test results, particularly laboratory and radiology data. Several participants stated that it typically took up to three working days for results to be uploaded to myHealth, which affected its practicality in urgent or time-sensitive clinical scenarios.

“It takes around three days for recent blood tests to be uploaded... it’s not ideal when we need timely information.” – Doctor

3.2.2 Pharmacist Access and Communication Gaps

All participants agreed that pharmacists currently face limited access to patient health data through myHealth. This issue was especially pronounced among private-sector and community pharmacists who are unaffiliated with Pharmacy of Your Choice (POYC)-designated pharmacies. The lack of access to current medication lists or diagnosis history was identified as a significant barrier to providing safe and effective pharmaceutical care.

“Private pharmacists don’t even have access to see what POYC meds patients are on... and patients don’t always know themselves.” – Community pharmacist

Participants also described communication gaps between healthcare professionals. Pharmacists were frequently left out of information loops regarding medication changes, new prescriptions, or adverse drug events. Participants commented that this lack of data sharing could potentially compromise continuity of care and limit the effectiveness of counselling provided to patients.

3.2.3 Integration Opportunities

The discussion highlighted strong support for expanding the functionality of the myHealth platform to allow greater integration of pharmacists into patient care. Participants consistently expressed the need for a unified, centralised medication record that would be accessible to all relevant healthcare professionals, including pharmacists, general practitioners, and nurses. This was viewed as a means of enhancing continuity of care, reducing medication discrepancies, and improving clinical workflow efficiency.

Several participants suggested the development of pharmacist-specific input sections within the portal, allowing pharmacists to document information such as side effects, medication reviews, and patient adherence issues. The ability to flag relevant clinical concerns was viewed as essential for improving interdisciplinary communication, particularly when pharmacists identify issues that require physician review or follow-up.

“There should be a section where pharmacists can flag issues like side effects for doctors to see later.” – Doctor

Further proposals included improving the visibility of allergy records and adverse drug reactions and consolidating medication records to include both acute and chronic treatments. This was regarded as a means to ensure a comprehensive view of a patient’s pharmacological history across settings.

In addition, participants raised the potential value of enabling appointment booking and laboratory test ordering directly through the myHealth platform. This functionality was discussed in relation to both general practitioners and pharmacists. For general practitioners, it was viewed as a practical measure to streamline referrals and follow-up investigations. For pharmacists, this capability could support clinical decision-making in

cases where further testing or specialist consultation is warranted following medication counselling or monitoring.

3.2.4 Usability and Patient Education

Patient-related challenges were also a recurrent theme. Participants expressed concern over limited patient engagement with the platform, particularly among older adults. Several patients were reportedly unaware of the portal’s functionalities or unable to navigate it due to lacking electronic identification credentials or digital literacy.

“Some people don’t even know they can log in to check their medications – they don’t have eID or never got help using it.” – Nurse

Suggestions to improve engagement included hosting local information sessions in collaboration with community pharmacies and local councils. These could offer practical demonstrations on how to access and use myHealth, particularly for elderly populations or those unfamiliar with digital health tools.

3.2.5 Consent and Data Privacy

Data privacy and patient consent were consistently mentioned as critical to ensuring trust in expanded pharmacist access. Participants advocated for a consent-driven model, where patients retain control over who can view or input data into their personal health records.

“There should be a checkbox or consent form—like granting permission to your pharmacist or doctor to view your file.” – Pharmacist

Suggestions included the use of digital consent forms or settings within the platform that would allow patients to authorise access by specific professionals. This was regarded as

a necessary step to facilitate pharmacist involvement without compromising patient privacy or autonomy.

3.2.6 Self-Monitoring and Telehealth Potential

The potential for patient-entered data and telepharmacy services was viewed positively by the participants. Several professionals noted that enabling patients to upload personal health data (such as blood pressure or blood glucose readings) could help promote self-management, particularly for those with chronic conditions such as hypertension or diabetes.

“Letting patients upload their own readings can give them more control over their condition.” – Doctor

Participants suggested that pharmacies could support this functionality by offering in-pharmacy measurement services, with results automatically or manually uploaded to the patient’s myHealth profile. Others proposed that patients be provided with tools or guides to perform self-monitoring at home and input the results directly through the portal or app.

The discussion also explored the potential for remote pharmacy services, where pharmacists could monitor trends in patient-entered data and provide virtual follow-up consultations or counselling. This was considered particularly useful for patients with limited mobility. Additionally, several participants saw value in linking self-monitoring data with alerts or reminders within the system to prompt timely interventions when readings fall outside of target ranges.

Chapter 4

Discussion

4.1 Interpretation and Implications of Findings

This study reveals strong support for pharmacist integration into the myHealth portal. With 84 percent of participants endorsing access and 94 percent willing to share pharmacy data digitally, there is clear public and professional readiness to see pharmacists assume a more central role in digitally enabled healthcare. Focus group participants validated this sentiment, highlighting current inefficiencies and fragmentation in patient care caused by the exclusion of pharmacists from accessing and contributing to shared health records.

Qualitative insights from the focus group reinforce these quantitative results. Participants in the focus group (including pharmacists, general practitioners, and nurses) described real-world inefficiencies and patient safety risks stemming from the limited visibility pharmacists currently have into patient records, laboratory results, and POYC Scheme entitlements. The POYC Scheme, launched in 2007, enables patients to receive free government-supplied medications from their chosen community pharmacy. However, focus group participants consistently reported challenges in verifying prescriptions, confirming medication histories, and reconciling treatment plans when patients switch pharmacies or receive care across multiple sites. In particular, the inability to access data integrated through systems like CARE, the POYC Unit's internal repository, undermines the scheme's intended benefits of personalised and efficient service delivery.

This convergence between focus group narratives and survey trends strengthens the reliability and validity of the findings. Stakeholders across both data sources described overlapping challenges such as delays in uploading laboratory results, lack of pharmacist input fields within the system, and administrative inefficiencies in confirming POYC eligibility. These limitations not only jeopardise patient safety but also hinder the

operational efficiency of Malta's healthcare delivery system, especially in the management of polypharmacy, anticoagulation, and chronic conditions.

Demographic trends in the survey responses reveal important considerations for future digital health strategy. Younger respondents (aged 18–30 years) demonstrated lower usage of myHealth and reduced willingness to upload self-monitored data. These results suggest a need for targeted digital engagement strategies focused on this demographic. As highlighted by Aungst et al. (2021), engagement with digital health tools depends not only on technical literacy but also on perceived relevance to personal health. Accordingly, enhancing platform utility through mobile-first design, reminders for preventive care, or integration with services such as telemedicine and travel health may improve uptake among younger users.

Beyond usage and willingness, the survey also revealed a statistically significant association between age group and perceived simplicity of the myHealth platform. Younger respondents (18–30 years) tended to rate the portal as simpler to use (ratings 1–2), whereas older adults, particularly those aged 60 years and above, were more likely to report difficulty (ratings 4–5). This relationship was confirmed through Chi-square analysis ($\chi^2 = 37.16$, $df = 20$, $p = 0.011$) and is illustrated in Figure 3.4. These findings align with qualitative feedback from the focus group participants, who consistently emphasised the challenges faced by elderly patients in navigating the platform due to limited digital literacy or difficulties with eID registration. Together, these results underscore the need for age-sensitive design, accessibility improvements, and targeted training initiatives to reduce digital exclusion and ensure equitable engagement with myHealth.

Although the association between occupation and support for pharmacist access did not reach statistical significance ($p = 0.0981$), a noticeable trend emerged whereby healthcare

professionals showed higher levels of endorsement. This trend aligns with literature demonstrating that clinicians with more direct experience of interdisciplinary workflows are more likely to recognise the clinical value of pharmacist participation in digital systems (Kosari et al., 2020; Osasu., 2024). These patterns suggest an opportunity for interprofessional advocacy to drive forward policy reform supporting pharmacist integration.

From a systemic perspective, the study's findings echo global evidence on the benefits of pharmacist involvement in digitally enabled care. A Cochrane review by de Barra et al. (2018) found that pharmacist-led services significantly reduced systolic and diastolic blood pressure while achieving improvements in glycaemic control. However, the exclusion of pharmacists from Malta's myHealth system impedes the replication of such outcomes locally. The strong alignment between this study's findings and those from international literature, including work by do Nascimento et al. (2023), and Wernhart et al. (2019), further supports the case for policy reforms that formalise pharmacist access to shared electronic records.

Additionally, insights from the focus group highlighted a variety of expanded roles that pharmacists could adopt if granted system access. These include recording adherence concerns, flagging potential drug interactions, submitting alerts for follow-up tests, and documenting pharmacy-based interventions. Such functionality would augment the clinical utility of myHealth for both prescribers and patients, fostering faster interventions, real-time communication, and optimised therapeutic outcomes.

There is also significant potential for pharmacists to engage with PGHD, which participants expressed willingness to upload via the platform. As demonstrated by Nundy et al. (2014) and Jim et al. (2020), integration of PGHD, including data from mobile apps, wearables, and digital monitoring devices, can enhance self-management, personalise

care, and improve patient-provider dialogue. Expanding myHealth functionality to include pharmacist receipt and interpretation of these data streams would support a more collaborative and proactive care model, particularly for chronic disease management.

Malta's compact healthcare infrastructure and existing national digital identity system (eID) offer a unique advantage for implementing role-based access for pharmacists. With the right legislative support, the myHealth platform could be expanded to include structured pharmacist dashboards, secure login credentials, audit trails, and role-defined access rights. These technical enhancements must be supported by comprehensive training initiatives to ensure pharmacists are equipped to use the platform effectively. Furthermore, public-facing campaigns that explain how pharmacist access improves care coordination, medication safety, and therapeutic continuity could enhance public trust and engagement.

In summary, the findings of this study reflect not only strong public and professional support for pharmacist integration into myHealth, but also highlight the operational, clinical, and policy-level changes needed to make this vision a reality. The integration of pharmacists into Malta's digital health system has the potential to reduce fragmentation, enhance interdisciplinary care, and elevate the overall standard of healthcare delivery in line with the best global practices.

4.2 Comparison with Existing Literature

The findings of this study align closely with a broad body of international literature that advocates for pharmacist integration into digital health ecosystems. Studies by Aungst (2021) and Carlqvist et al. (2021) have demonstrated that pharmacist access to EHRs improves adherence, supports therapy monitoring, and facilitates interdisciplinary collaboration. Similarly, Kosari et al. (2020), and Abu Farha et al. (2024) have highlighted

public trust in pharmacists and widespread support for their expanded roles within digital health systems. These findings parallel the high levels of endorsement for pharmacist access observed in the current study, with 84% of survey participants supporting integration into the myHealth platform and 94% expressing willingness to share pharmacy-generated data.

Barriers such as fragmented systems, delayed data uploads, and lack of interoperability have been widely documented in international studies and were echoed in the present research. Hettinger et al. (2023) and Jiang et al. (2025) reported that systemic inefficiencies undermine the clinical utility of digital health tools, particularly when healthcare professionals face inconsistent access to updated records. This concern was similarly expressed by participants in the Maltese focus group, who cited delays of up to three days in laboratory result uploads and an inability to verify POYC entitlements as detrimental to care continuity.

Concerns surrounding privacy, consent, and data protection are also consistent with international literature. Adjekum et al. (2018) emphasized the need for transparency, informed consent mechanisms, and robust audit trails to maintain patient trust. These align with the sentiments expressed by the focus group participants in this study, who advocated for consent-based pharmacist access and clearer data governance frameworks. In line with these concerns, studies by Kayyali et al. (2017) and Kharaba et al. (2022), underscored the role of pharmacists in supporting digital literacy and helping patients navigate electronic systems, an area of untapped potential in Malta's current model.

Public and professional endorsement of pharmacist contributions to digital health records, as documented in this study, mirrors global findings. For instance, research by Kosari et al. (2020) in Australia found pharmacist involvement in national health records improved

medication safety and reduced service duplication. In Germany, Eickhoff et al. (2021) detailed how expanding digital infrastructure, including digital health exchanges and telematic systems, enabled enhanced pharmacist access to patient records, improving real-time verification and enhancing continuity of care. In the United Kingdom, pharmacist access to the National Health System (NHS) Summary Care Record has similarly enhanced emergency dispensing. The growing recognition of the “digital pharmacist” role, as highlighted by Santos Silva et al. (2022), underscores how pharmacists can leverage digital tools to strengthen therapy monitoring and chronic care management. These models serve as practical exemplars for the Maltese system, which still insulates pharmacists from full digital access.

The role of pharmacists in managing PGHD is another theme that emerged both in this study and the literature. Nundy et al. (2014), Tiase et al. (2020), and Khatiwada et al. (2024) found that while PGHD enhances patient engagement, healthcare professionals remain cautious about its integration due to concerns about clinical reliability, workflow burden, and data privacy. The focus group participants in this study echoed these sentiments, supporting the inclusion of self-monitored blood pressure or glucose readings, but only when contextualised within a structured clinical setting. Jim et al. (2020) reinforced the importance of integrating PGHD into care pathways with appropriate validation mechanisms to enhance safety and usability.

Differences in implementation speed across jurisdictions were also apparent. While the COVID-19 pandemic catalysed rapid digital transformation in many European countries, Malta’s progress remained comparatively limited. Merks et al. (2021) documented how community pharmacists across Europe adopted teleconsultations, e-prescriptions, and remote services during the pandemic, accelerating their digital roles. In contrast, participants in the current study reported minimal change in pharmacist access to

myHealth during this period, suggesting a slower institutional response and missed opportunities for long-term reform.

Usability and training-related challenges are also consistent across contexts. Cobelli and Chiarini (2023) found that pharmacists often struggled with digital platforms due to non-intuitive interfaces and lack of integration into daily workflows—concerns that were also voiced by Maltese healthcare professionals. Hettinger et al. (2023) similarly noted that many digital initiatives and health information exchanges were not originally designed with pharmacists in mind, necessitating pharmacy-specific adaptations to address workflow and usability gaps. Krauss et al. (2022) further illustrated how granting pharmacists structured EHR access can overcome this exclusion and enhance continuity of care, reinforcing that pharmacists must be included in digital system design and implementation to avoid persistent marginalisation within healthcare teams.

Systemic integration is essential to overcoming these obstacles. Blandford et al. (2018) proposed a structured implementation framework for NHS digital tools, focusing on early end-user engagement, organisational readiness, and real-world usability. The present study supports these principles, with participants emphasising the need for better system design, stakeholder consultation, and structured pharmacist input fields in myHealth. These findings also align with do Nascimento et al. (2023), who found that while healthcare professionals value digital tools for enhancing self-management, they often remain unsure about their influence on clinical outcomes without streamlined integration. The literature also reinforces the critical role of training and competence in digital adoption. Farghali and Borycki (2024), in a scoping review of e-prescribing, found that insufficient digital literacy and lack of structured training contributed to workflow disruptions and increased risk of errors in community pharmacies. These findings emphasise that competencies such as data interpretation, cybersecurity awareness, and

digital communication must be embedded in both undergraduate training and continuing professional development. Without such investment, pharmacists' confidence and capacity to participate fully in digital care delivery may remain limited.

Ultimately, the challenges identified in this study, ranging from infrastructural limitations and training gaps to legal ambiguity and system usability, are not unique to Malta. Similar barriers have been observed globally and addressed through targeted reforms, including pharmacist education, stakeholder co-design, and policy-level mandates for digital inclusion. Comparative studies from Australia, the United Kingdom, and the wider European Union suggest that successful pharmacist integration hinges on enabling access, streamlining workflows, and building trust among patients and healthcare professionals alike. The present findings not only confirm Malta's alignment with international trends but also underscore the urgency of adapting global best practices to the local context.

4.3 Policy Recommendations

In light of the study findings and supported by international literature, several strategic recommendations are proposed to enhance the integration of pharmacists into Malta's myHealth platform and improve the quality of patient-centred care.

4.3.1 Enable Structured Pharmacist Access and Communication

Pharmacists should be granted structured, role-based access to the myHealth platform, enabling them to view essential clinical information such as medication histories, laboratory test results, allergy records, and entitlement details linked to the POYC Scheme. Integration with the CARE system, a digital repository for Schedule V applications and patient entitlements, is particularly important. Although CARE is

currently underutilised in pharmacy practice due to restricted access, making it viewable within myHealth would streamline dispensing, reduce administrative duplication, and improve continuity of care across pharmacy and prescriber settings.

In addition to access, pharmacists must be empowered to contribute meaningful clinical documentation. The platform should support structured input fields where pharmacists can record notes on adverse drug reactions, medication adherence concerns, suspected interactions, or interventions provided during medication reviews. These inputs should be visible to other healthcare professionals to foster a unified and collaborative approach to care delivery.

To further strengthen pharmacist engagement, the introduction of two-way communication features is recommended. Secure messaging and real-time consultation alerts, particularly in cases involving therapy changes or flagged safety issues, can facilitate timely decision-making and therapeutic alignment. Hoonakker et al. (2017) showed that secure messaging systems improve communication and workflow in primary care settings, while a recent systematic review by van Offenbeek et al. (2025) confirmed that such bidirectional communication tools enhance proactive care, reduce errors, and support multidisciplinary coordination. Embedding these functionalities within myHealth would not only enhance clinical efficiency but also affirm the pharmacist's role as a core contributor to integrated digital healthcare.

4.3.2. Improve Data Timeliness and System Interoperability

System-wide delays in the upload of diagnostic and clinical data significantly diminish the effectiveness of myHealth as a real-time clinical decision-making tool. Timely access to laboratory results, imaging reports, and other diagnostic information is essential for ensuring continuity of care, particularly for patients with complex or chronic conditions

who require close monitoring. To address this limitation, formal service-level agreements should be established with both public hospitals and private diagnostic providers to guarantee prompt, automated data transmission into the myHealth platform. Ensuring that results are uploaded in near real-time would enhance the platform's clinical utility and facilitate earlier interventions by all healthcare professionals, including pharmacists. Moreover, improving interoperability between myHealth and other key digital systems, such as the POYC platform and hospital-based systems like iSOFT, is essential to streamline communication across different levels of care. At present, the lack of integration between these systems results in fragmented care, duplication of records, and inefficiencies that compromise patient safety and treatment outcomes. Seamless interoperability would not only allow pharmacists to access comprehensive patient histories and monitor therapeutic progress but also strengthen collaboration between primary and secondary care providers. This unified data flow would support a more holistic, patient-centred approach to care delivery and enhance the relevance of myHealth as a core tool in Malta's national healthcare strategy. By addressing these structural barriers, the platform could evolve into a fully integrated ecosystem that supports timely, coordinated, and efficient healthcare services across all care settings.

4.3.3. Strengthen Digital Literacy and Patient Engagement

Digital health literacy remains a significant barrier for many patients, particularly older adults, individuals with limited formal education, and those with physical or cognitive impairments. Educational campaigns should therefore be tailored to address motivational, behavioural, and usability-related challenges. Perski et al. (2017) emphasised that engagement with digital health tools is shaped not only by the design of the intervention but also by the broader user context. Platforms that are relevant, usable, and responsive

are more likely to be adopted and sustained. To translate these principles into practice, community pharmacies and local councils could collaborate on outreach efforts by hosting digital literacy workshops, offering one-on-one assistance, and distributing visual or multilingual instructional materials. Such community-led initiatives can play a pivotal role in improving awareness, registration rates, and confidence in using the myHealth portal.

Targeted interventions are also needed for patients with sensory impairments or lower levels of health literacy. As Jacob et al. (2021) recommend, platforms should incorporate accessibility features such as sign language interpretation, visual navigation tools, and culturally adapted materials to enhance usability and trust. Expanding on this, Azzopardi-Muscat and Sørensen (2019) advocate for embedding health literacy into digital public health initiatives, stressing the need to co-design tools that are inclusive and responsive to diverse population needs. Their framework emphasises the role of public institutions in reducing digital exclusion by creating supportive environments that enable equitable participation in digital health systems. Applying such a perspective in Malta could ensure that future updates to the myHealth platform are both inclusive and empowering, supporting national efforts toward a digitally literate and health-engaged population.

4.3.4. Invest in Pharmacist Training and Credentialing

Pharmacists must be equipped with the digital competencies required to interpret laboratory results, document clinical interventions, and contribute meaningfully to digital care coordination. Integrating digital health skills into both undergraduate and postgraduate pharmacy curricula is a critical step toward ensuring that the future workforce is prepared for digital transformation. Mantel-Teeuwisse et al. (2020) emphasised that early exposure to tools such as EHRs, teleconsultation platforms, and

digital monitoring systems increases preparedness and confidence among pharmacy graduates entering clinical practice.

Beyond formal education, ongoing professional development is essential to keep pace with evolving technologies. National continuing professional development programmes should incorporate structured modules on digital systems like myHealth, data interpretation, and interprofessional documentation standards. As highlighted in the 2023 systematic review by do Nascimento et al. healthcare professionals frequently reported lacking adequate training in digital health systems as a major barrier to adoption. The review also identified workload pressures, limited time, and the perceived complexity of digital tools as further deterrents to effective use, underscoring the need for training initiatives that are practical, accessible, and tailored to real-world practice.

To ensure uniform digital competency across the pharmacy workforce, the introduction of a national digital credentialing framework is recommended. This would allow pharmacists to demonstrate their proficiency in using health technologies, fostering trust among other healthcare professionals and patients. Such frameworks should be competency-based, encompassing practical skills in navigating digital interfaces, ensuring data security, and applying clinical reasoning within digital contexts. Credentialing may also support career progression, reinforce accountability, and promote a culture of digital excellence across the profession.

Together, these efforts would not only empower pharmacists to take on more active roles within digital ecosystems like myHealth but also improve the quality, safety, and efficiency of care delivered through interdisciplinary collaboration.

4.3.5. Support Remote Pharmaceutical Services

To keep pace with the increasing demand for decentralised and accessible healthcare services, the myHealth platform should be adapted to support remote pharmaceutical care. This includes enabling pharmacists to upload pharmacy-obtained readings such as blood pressure and blood glucose levels, which are frequently measured during medication reviews and chronic disease management. Incorporating this data into the patient's central health record would provide other healthcare professionals with timely, relevant information and reduce the risk of fragmented care.

In addition to passive data uploads, myHealth should facilitate real-time, interactive remote services. These include virtual consultations, secure messaging between patients and pharmacists, and digital tools for monitoring medication adherence. Such features are particularly beneficial for patients with chronic illnesses, older adults, and individuals with reduced mobility, who may find it challenging to attend regular in-person appointments. Allowing pharmacists to provide remote follow-up, counselling, and adherence support would not only extend their clinical reach but also improve continuity of care.

These recommendations align with the World Health Organization's (WHO) Global Strategy on Digital Health 2020–2025, which emphasises the need for countries to adopt equitable, inclusive, and interoperable digital systems that support all health professionals—including pharmacists—as key actors in the delivery of integrated services. The WHO specifically encourages member states to invest in scalable platforms that support remote care delivery, noting that digitally supported, multidisciplinary

approaches are critical to achieving universal health coverage in an evolving healthcare landscape.²

By implementing these enhancements, Malta can modernise its digital infrastructure and ensure that pharmacists are not left behind in the transition to more distributed and patient-centred models of care. Such measures will also prepare the national health system to better withstand public health emergencies by enabling remote access, flexible service provision, and sustained chronic disease management, even during times of limited mobility or healthcare resource constraints.

4.3.6. Enhance Governance, Consent, and Transparency

Robust governance frameworks must underpin pharmacist access to clinical data to ensure that digital health systems operate securely, ethically, and transparently. Central to this is the principle that patients must retain control over their health information, including the ability to grant or restrict access through role-based permissions, visible audit trails, and clear opt-in consent mechanisms.

In the context of digital health, consent should evolve from traditional one-time approvals into computable and dynamic authorisations that can be embedded within EHR systems. Milosevic and Pyefinch (2024) proposed a framework grounded in deontic logic to support the computable expression of consent using HL7 FHIR (Fast Healthcare Interoperability Resources), an internationally recognised standard for exchanging healthcare data. Their model, tested in a clinical trial use case, enables permissions,

² World Health Organization. Global Strategy on Digital Health 2020–2025. Geneva: WHO; 2021[cited 2025 Jul 8]. Available from: <https://apps.who.int/iris/handle/10665/344249>.

obligations, and prohibitions to be represented in machine-readable formats that integrate seamlessly into clinical workflows. This approach ensures that pharmacists and other healthcare professionals are granted access only when appropriately authorised and within policy-defined constraints, offering a pathway to enhance both patient control and interoperability in platforms such as myHealth.

However, the success of such systems is not solely technical; ethical considerations remain paramount. Ali et al. (2025) introduce the concept of “digital benefit sharing” as a model for recognising the contributions of individuals and communities who provide health data for public health purposes. This approach, grounded in global health justice, argues that those who contribute data (intentionally or passively) should receive meaningful benefits, whether through improved healthcare access, enhanced services, or greater control over how their data is used. The authors further advocate for more inclusive and participatory governance structures that engage data contributors in decisions regarding data sharing and reuse.

Building public trust is essential to the long-term viability of pharmacist integration into digital platforms such as Malta’s myHealth. Torous and Roberts (2017), in their review of mental health technologies, highlight a significant trust deficit in digital health, noting that only 8% of individuals in a United States-based industry survey reported being willing to share their health data with technology companies. This low level of trust reflects broader concerns about the security, privacy, and transparency of digital health applications. Without public confidence, patients may withhold information, opt out of sharing, or disengage entirely from digital services—thereby undermining the goals of integrated, collaborative care.

To address these challenges, it is essential that the governance of digital health platforms prioritises transparency, accountability, and inclusivity. Patients must be clearly informed

about how their data is accessed and by whom. Role-based access must be complemented by visible audit trails and consent mechanisms that can be updated in real time. Information campaigns that explain the role of pharmacists within digital health systems, including their responsibilities and data access limitations, are vital to reducing misinformation and fostering trust. Moreover, implementing frameworks for digital benefit sharing could reinforce ethical data use and encourage broader public participation in health innovation. Together, these measures would lay the foundation for a secure, trustworthy, and equitable digital ecosystem in which pharmacists can play a fully integrated role.

4.3.7. Establish Digital Leadership and Strategic Partnerships

To accelerate pharmacist integration into digital health systems, national healthcare structures should consider appointing a formal digital pharmacy leadership role. This role would ensure that pharmacists are included in the planning, design, and governance of digital health services, providing strategic direction and oversight across community and hospital settings.

Miozza et al. (2024) examined the digital transformation of the pharmaceutical industry and highlighted persistent gaps in workforce readiness, leadership, and system evaluation that limit progress toward digital maturity. These findings resonate with the Maltese context, where pharmacists remain excluded from essential systems like myHealth. Strong digital leadership, coupled with strategic investment in workforce development, could help guide cross-sector efforts to address these deficiencies, champion system enhancements, and promote data-driven pharmacy practice.

In parallel, strategic partnerships with academic institutions, technology providers, and public health bodies are essential. Such collaborations can support training programmes,

drive innovation, and build capacity for digital service delivery. Academic partnerships in particular can help embed digital skills into pharmacy education, ensuring that graduates are equipped for evolving practice demands.

To support these leadership and partnership efforts, a clear governance framework is needed. National health strategies should explicitly include pharmacists in digital health planning and implementation. Dedicated funding and resources must be allocated to support system upgrades, interoperability with platforms such as POYC and iSOFT, and the development of pharmacist-specific functionalities within myHealth.

4.3.8. Promote Research on Clinical and Economic Outcomes

Future research should utilise nationally representative samples and longitudinal methodologies to assess the impact of pharmacist participation in digital health platforms such as myHealth. While the benefits of pharmacist-led interventions have been well-documented in traditional care models, their effectiveness within integrated digital environments remains underexplored. Studies should aim to quantify outcomes across clinical and economic domains, including improvements in medication adherence, reductions in adverse drug events, decreased emergency visits or hospital admissions, and overall healthcare cost savings.

In addition to these quantitative indicators, research should also assess patient satisfaction, trust in pharmacist-delivered care, and the impact of digital engagement on health literacy and self-management. Mixed-methods studies could provide valuable insights into the contextual and behavioural factors that shape both professional adoption and patient participation in pharmacist-integrated digital services.

Moreover, implementation research is needed to evaluate the scalability and sustainability of digital pharmacy models across different healthcare settings, including rural and

underserved areas. These findings would inform future upgrades to systems like myHealth and guide policy development around pharmacist access, interoperability, and user interface design. Evidence generated through such research could also be used to justify resource allocation and support national strategies aimed at expanding the role of pharmacists within multidisciplinary, digitally enabled care teams.

4.4 Limitations

This study presents several limitations that should be considered when interpreting the findings. From a methodological perspective, the geographic concentration of physical questionnaire distribution, which were limited to pharmacies in Malta's southern region, may have introduced regional bias and restricted the generalisability of results to the broader population. Although the online version of the bilingual questionnaire was nationally accessible, reliance on both in-pharmacy and social media-based dissemination likely favoured participants with higher digital literacy or pre-existing interest in healthcare innovation.

The total sample size ($N = 189$) was sufficient for descriptive and exploratory analysis but limited the scope of inferential statistics, particularly when stratifying by age or occupation. While certain trends were observed—such as stronger support for pharmacist access among healthcare professionals ($p = 0.0981$)—the statistical power was insufficient to confirm these associations definitively. Additionally, physical questionnaire uptake was low, which may have introduced self-selection bias. Individuals more familiar with digital health or supportive of pharmacist-led services may have been more inclined to participate, potentially inflating the apparent level of endorsement.

All survey data was self-reported and not cross-referenced with actual usage metrics from the myHealth platform. This limits the ability to verify reported behaviours, such as frequency of use or willingness to share data. Future research could consider integrating anonymised usage logs, with appropriate consent, to gain a more objective understanding of engagement patterns.

The qualitative component was similarly constrained, with a single focus group comprising eight participants. Although thematic saturation was achieved and the insights aligned with international literature, the limited number of participants may not fully capture the breadth of perspectives across different healthcare sectors. Segmenting future focus groups by profession or healthcare setting could yield more nuanced insights into system-specific challenges and opportunities.

Digital exclusion emerged as a notable limitation. Participants highlighted that older adults often lacked familiarity with the myHealth portal or faced difficulties in accessing and navigating it, despite increased mobile and internet availability. This concern aligns with previous findings by Hole et al. (2021) and Kayyali et al. (2017), who stressed the importance of age-appropriate design and widespread digital health education to improve equity. In Malta, disparities in digital readiness and eID registration may have led to underrepresentation of older adults and disadvantaged socioeconomic groups in the sample.

Concerns around data quality and governance also surfaced, particularly in relation to PGHD. Participants expressed hesitancy about relying on self-reported values, such as blood pressure or glucose readings, without clear clinical validation mechanisms. This sentiment mirrors findings by Jim et al. (2020), who identified medico-legal concerns and unclear accountability frameworks as barriers to PGHD integration in clinical decision-making.

The myHealth portal's existing structural limitations—such as delayed data uploads and lack of interoperability with internal hospital systems—were echoed by participants and align with broader challenges identified in international literature. For instance, Kataria and Ravindran (2020) critically appraised the limitations of EHRs systems, noting poor interoperability, administrative overload, and clinician burnout. Such findings resonate with the preference expressed by some hospital-based professionals for internal systems like iSOFT over myHealth, illustrating operational shortfalls in multidisciplinary care provision.

In addition, broader systemic barriers persist. As Kallen et al. (2024) noted, there remains a lack of robust quantitative evidence on the cost-effectiveness of digital health interventions, especially in smaller or resource-constrained health systems. Without such evidence, healthcare authorities may struggle to justify long-term investment or scaling of pharmacist-access functionalities within platforms like myHealth.

While international evidence, such as the Cochrane review by de Barra et al. (2018), supports the effectiveness of pharmacist-led interventions, most studies were conducted in high-income countries where pharmacists have established prescribing rights and integrated digital access. These structural differences limit the applicability of findings to Malta, where pharmacists currently remain excluded from direct interaction with national health records.

Finally, both this study and international research such as Nundy et al. (2014) underscore the continued relevance of the digital divide. Workflow disruptions and limited integration of patient-generated health data (PGHD) into routine practice were common concerns. In Malta's current landscape, where pharmacists are not yet fully embedded within digital clinical pathways, these challenges are further amplified by fragmented

records and the absence of clearly defined procedural authority regarding pharmacist contributions.

In summary, while the study findings are robust and supported by international parallels, they must be contextualised within the constraints of sampling, generalisability, system maturity, and structural readiness. Addressing these limitations through improved study design, longitudinal tracking, expanded stakeholder engagement, and legal reform will be essential to advance the case for pharmacist integration into Malta's digital health ecosystem.

4.5 Future Recommendations

Future research should adopt larger, nationally representative samples and longitudinal designs to assess the clinical and economic outcomes of pharmacist integration into myHealth, including medication adherence, adverse event reduction, and cost-effectiveness. Qualitative studies with broader and more diverse stakeholder groups, including patients, hospital-based professionals, and digitally excluded populations, are needed to capture sector-specific challenges and user perspectives.

Further exploration of digital exclusion, governance models, and patient trust is also recommended, particularly in relation to dynamic consent, data security, and benefit-sharing frameworks. Pilot projects evaluating pharmacist-led digital services, interoperability with systems such as POYC and iSOFT, and the effectiveness of digital training and credentialing initiatives would provide valuable evidence for future policy and investment decisions.

4.6 Conclusion

This research examined public and professional perceptions of pharmacist integration into Malta's myHealth platform. Findings from both the quantitative survey and qualitative focus group revealed overwhelming support for granting pharmacists access to EHRs and uploading pharmacy-generated health data. Participants recognised the value of pharmacist contributions to medication management, therapy optimisation, and chronic disease monitoring.

Despite this support, implementation challenges persist. Privacy concerns, usability limitations, and delayed data uploads were key barriers highlighted in both phases of the study. These issues are consistent with international research and underscore the importance of strategic reforms in digital policy, infrastructure, and education.

This study is the first of its kind in Malta to comprehensively assess attitudes toward pharmacist digital access, offering both a public and healthcare professional lens. By triangulating data from different stakeholder groups, the research provides a more robust understanding of the readiness for pharmacist inclusion in digital health systems.

Malta's relatively centralised health infrastructure and existing national eID framework present a unique opportunity to act on these findings. With targeted reforms, such as role-based access, interoperability improvements, and pharmacist-specific training, the integration of pharmacists into myHealth can become a tangible reality.

Pharmacist integration into myHealth is both feasible and desirable. The evidence presented here provides a solid foundation for policy development and system enhancement. Future efforts should focus on addressing identified barriers, investing in digital readiness, and promoting interprofessional collaboration to unlock the full potential of pharmacists in delivering safe, efficient, and digitally enabled care.

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List of Publications and Abstracts

Abstract presented at MedTech 2024 as poster (7th of November 2024 till 8th November 2024).

Pharmaceutical Digitisation through myHealth

Katarina Maria Bugeja, Lilian M. Azzopardi

Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta

This study explores the potential evolution of the MyHealth to enhance pharmaceutical services, with the goal of improving patient care, continuity, and healthcare outcomes. The aims of this part of the study are to assess healthcare professionals (HCPs) perceptions of MyHealth and its application to support pharmaceutical services.

A quantitative approach was employed, utilizing a questionnaire distributed to HCPs and patients in both English and Maltese. The questionnaire, validated by an expert panel, captures data on MyHealth awareness, usage, and opinions on pharmacist access to the platform. It also explores potential opportunities for expanding pharmaceutical services through MyHealth. The questionnaire was distributed online and via seven pharmacies, and as of September 20, 2024, a total of 165 responses had been collected. Data analysis is being conducted to evaluate user demographics, opinions, and opportunities for improving the platform's use in pharmacy services. Preliminary validation and reliability testing refined the questionnaire, enhancing its clarity, readability, and relevance for the target populations. Early insights suggest that participants view the platform positively but recognize areas for improvement in service elaboration, particularly in medication adherence and telepharmacy services.

MyHealth presents a valuable opportunity to integrate pharmaceutical services, enhance patient empowerment, and streamline care. Expansion of the platform could support telepharmacy and medication therapy management, addressing gaps in healthcare accessibility.

Pharmaceutical Services Digitalisation Through myHealth

Katarina Maria Bugeja, Lilian M Azzopardi

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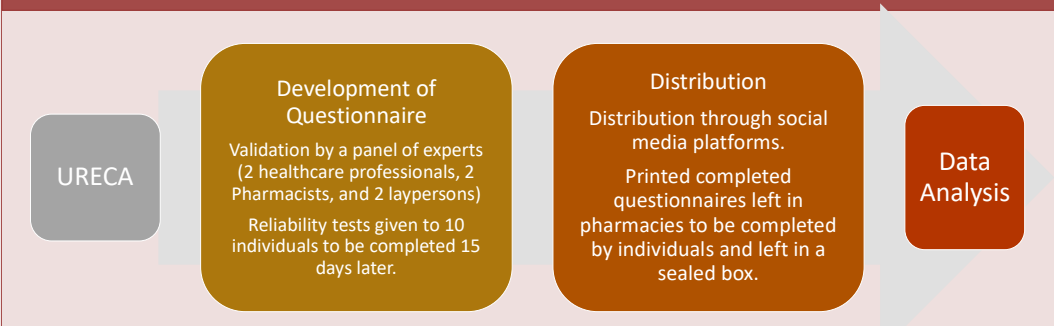
INTRODUCTION

MyHealth is an information and communications technology-related portal that has reengineered the way health-care providers and patients get and access information. The goal of the myHealth site, which was launched in 2017, is to make healthcare more accessible to patients and clinicians.¹

AIMS

- ❖ Identify healthcare professionals' views on myHealth's benefits.
- ❖ Evaluate myHealth's potential use to facilitate provision of pharmaceutical services.
- ❖ To propose elaboration of pharmaceutical services through myHealth.

METHOD



RESULTS

Demographics (a total of 172 responses)			Awareness of myHealth (N= 172)		
				Yes response	No response
18-25	34	19.8%	Have people heard of myHealth?	161 (93.6%)	11 (6.4%)
26-30	10	5.8%	Do people know what services myHealth provides?	143 (83.1%)	29 (16.9%)
31-40	43	25%	Have people used myHealth before?	141 (82%)	31 (18%)
41-50	37	21.5%	Have people received appointments via myHealth?	49 (28.5%)	123 (71.5%)
51-60	24	14%	Do people believe that their pharmacist should have access to their myHealth data?	141 (82%)	31 (18%)
60+	24	14%	Have people ever had pharmaceutical services such as blood pressure and blood glucose testing, done by their pharmacist?	27 (15.7%)	145 (84.3%)
Where 134 (77.9%) were female and 38 (22.1%) were male.			Are people willing to have their pharmaceutical service results such as blood glucose testing, added to myHealth for future reference?	106 (93%) (n=114)	8 (7%) (n=114)

CONCLUSION

By employing digital mobile platforms (mHealth) tools in pharmacy practice, pharmacists can provide high-quality services and patient care. Because of the portability, mHealth tools allow pharmacists to have consistent access to clinical patient information. Incorporating mHealth into regular practice of care enables patients to receive efficient, effective, and secure pharmacological care.²

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Abstract accepted as poster at 83rd FIP World Congress of Pharmacy and Pharmaceutical Sciences 2025 (Copenhagen, Denmark from 31 August to 3 September 2025)

Pharmacist Contribution to myHealth Portal

Katarina Maria Bugeja

Professor Lilian M. Azzopardi

Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta

Introduction: myHealth is a digital health platform used in Malta designed to improve access to medical information for both patients and healthcare professionals. Currently, pharmacists lack direct access to the portal, which limits their role in integrated patient care.

This study aimed to evaluate healthcare professionals' perception of myHealth, its potential to support pharmaceutical services, and opportunities for expanding pharmacist access.

Method: A quantitative approach was employed using a validated questionnaire distributed in English and Maltese to healthcare professionals and the general public. Additionally, a focus group comprising 8 healthcare professionals was organized to discuss opportunities for pharmaceutical service delivery through myHealth.

The study was conducted in a community pharmacy setting. The main outcome measures included perceptions of pharmacist access to myHealth, awareness and usage patterns, and suggestions for enhancing pharmaceutical services through the platform.

Results: A total of 189 responses were collected, with 37% of participants being healthcare professionals and 63% being laypersons. The majority of respondents (78%) were female, and the largest age group represented was 31-40 years, accounting for 23% of participants. Among the respondents, 95% reported having knowledge of myHealth,

while 84% were aware of the services it provides. Additionally, 83% had utilized the platform, and 28% had received appointments via myHealth.

Regarding pharmacist services, 84% of participants supported granting pharmacists' access to myHealth, emphasizing potential benefits such as improved medication management, enhanced care coordination, and reduced medication errors. Furthermore, 94% (n=129) agreed that pharmaceutical services provided in pharmacies should be recorded in myHealth data, ensuring a more comprehensive patient record. However, 16% of respondents opposed pharmacist access, citing concerns related to privacy and data security.

During the focus group discussion, participants emphasized that myHealth has the potential to act as a bridge between primary and secondary healthcare. By granting pharmacists access to the platform, communication between general practitioners, specialists, and pharmacists could improve, leading to better medication reconciliation and adherence monitoring. Expanded services, such as telepharmacy, were highlighted in the open-ended responses as a way to enhance medication adherence and provide pharmaceutical care to patients in remote areas. Additionally, respondents suggested developing a user-friendly interface for older persons to increase accessibility.

Conclusion

Healthcare professionals and patients support the evolution of myHealth to include pharmacist participation. Integrating pharmacists into the platform would allow for more comprehensive medication therapy management, better communication between healthcare providers, and increased patient safety. Potential expansions include telepharmacy and medication therapy management, addressing gaps in healthcare accessibility and ensuring pharmacists can contribute more effectively to patient care. Strengthening myHealth's role as a link between primary and secondary healthcare could lead to improved patient outcomes and a more coordinated healthcare system.



Pharmacist Contribution to myHealth Portal

Katarina Maria Bugeja and Professor Lilian M Azzopardi

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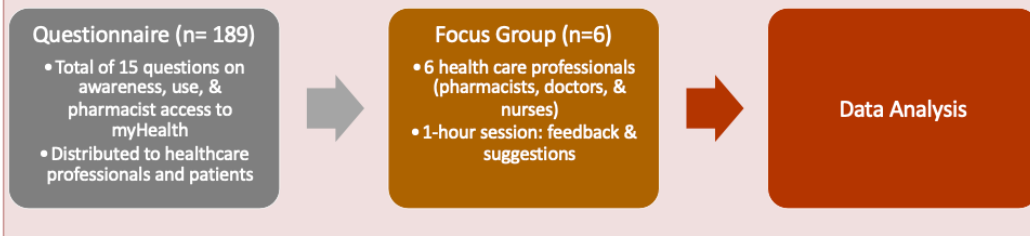
INTRODUCTION

• myHealth is Malta's national digital health portal launched in 2017, providing access to lab results, appointments, imaging, and data sharing with doctors. This study explores extending pharmacist access to support medication optimisation and digital pharmaceutical services¹.

AIMS

- Assess public and healthcare professional awareness of myHealth
- Evaluate support for pharmacist integration
- Identify ways to expand pharmacy services through the portal

METHOD



RESULTS

Demographics (N= 189)			Awareness of myHealth (N= 189)		
18-25	42	22%	Questions:		
26-30	11	6%	Heard of myHealth		
31-40	43	23%	Know what myHealth provides		
41-50	42	22%	Used myHealth before		
51-60	26	14%	Got appointments via myHealth		
60+	25	13%	Support pharmacist access		
Where 147 (78%) were female			Willing to upload pharmacy data (eligible respondents n=137)		
			Yes	No	
			95%	5%	
			84%	16%	
			83%	17%	
			28%	72%	
			84%	16%	
			94%	6%	

CONCLUSION

By employing digital mobile platforms tools in pharmacy practice, pharmacists can provide high-quality services and patient care. Because of the portability, mHealth tools allow pharmacists to have consistent access to clinical patient information. Incorporating mHealth into regular practice of care enables patients to receive efficient, effective, and secure pharmacological care.²

REFERENCES

- 1 Bezzina F, Camilleri E, Marmarà V. Public Service Reforms in a Small Island State. Vol. 22, Public Administration, Governance and Globalization. Cham: Springer International Publishing; 2021.
- 2 International Pharmaceutical Federation (FIP). mHealth Use of Mobile Health Tools in Pharmacy Practice [online]. The Netherlands: FIP; 2019 [cited 2024 Oct 7]. Available from: <https://www.fip.org/files/content/publications/2019/mHealth-Use-of-mobile-health-tools-in-pharmacy-practice.pdf>

Appendices

Appendix A Ethics Approval

A.1) Phase 1 Questionnaire: Directed towards the general public and healthcare professionals.



Figure A.1 Official FREC approval letter

A.2) Phase 2 Focus group: Directed towards 8 healthcare professionals.

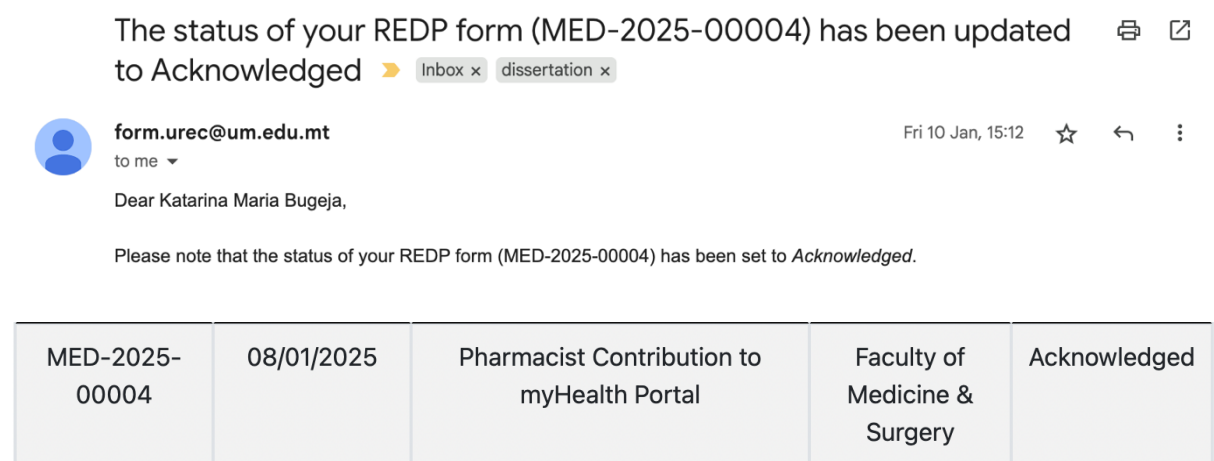


Figure A.2 Confirmation of Ethics Approval via email and UREC platform

Appendix 2 Questionnaire

Pharmaceutical Services Digitalisation Through myHealth

My name is Katarina Maria Bugeja, and I am a student at the University of Malta, presently reading for a Bachelor of Science (Hons.) in Pharmaceutical Science degree. I am conducting a research study for my project entitled: “Pharmaceutical Services Digitalisation Through myHealth”. This project is being supervised by Professor Lilian M. Azzopardi.

I am currently conducting research that’s aim is to investigate ways to utilise the health portal myHealth to incorporate pharmaceutical services and to find out how much of the Maltese population actually utilises myHealth. The survey that you have been invited to complete forms part of this study. This will take you approximately 10 minutes to complete. Any data collected from this survey will be used solely for purposes of this study. There are no direct benefits or anticipated risks in taking part.

Should you wish to participate, you will be asked to fill out an anonymous questionnaire that involves questions about myHealth and your views on the services it provides. Data collected will be collected in an anonymous format. That is, I will not know who you are from the responses you have provided, and at no point will you be asked to reveal your personal identity. Moreover, the data will be stored securely and will only be accessible to me (the researcher), my supervisor, and if need be, any possible examiner(s) of the project.

Participation in this study is entirely voluntary; in other words, you are free to accept or refuse to participate, without needing to provide a reason. You are also free to withdraw from the study at any time during the questionnaire by closing the online questionnaire, without needing to provide any explanation and without any negative repercussions for you. It is not possible to amend the responses or withdraw the submitted responses after completing the questionnaire, as the responses are submitted in an anonymous manner.

At no point will you be asked to provide your name or any other personal data that may lead to you being identified. Furthermore, you may skip over any questions that you do not wish to answer.

If you wish to participate in this study, please click the button that says, "I agree to participate". If not, please close the browser window (or click "I do not wish to participate").

Thank you for your time and consideration. Should you have any questions or concerns, please do not hesitate to contact me by email at katarina.bugeja.20@um.edu.mt, you can also contact my supervisor via email: lilian.m.azzopardi@um.edu.mt

Sincerely,

Katarina Maria Bugeja

katarina.bugeja.20@um.edu.mt

Jiena Katarina Maria Bugeja, fejn fil-preżent qegħdha insegwi Bachelor of Science (Hons.) in Pharmaceutical Science degree. Bħala parti mill-kors, qegħdha nagħmel proġett bit-titlu, "Pharmaceutical Services Digitalisation Through myHealth" fejn l-għan ta' dan l-istudju hu li jiġu investigati modi kif jintuża l-portal tas-saħħa myHealth biex jiġu inkorporati servizzi farmaċewtiċi u biex jiġi investigat kemm mill-popolazzjoni Maltija tutilizza myHealth. Is-sehem tiegħek f'dan l-istudju jista' jgħin biex ikollna aktar għarfien kif inkunu nistgħu nipprovdu aktar għajjnuna fuq l-kwalità tal-ħajja lill-pazjenti bħalek u biex inkomplu navvanzaw fit-tagħlim tagħna biex noffru servizz aħjar. Kull informazzjoni miġbura tintuża biss għal għan jew l-għanijiet ta' dan l-istudju. Bħala parteċipant/a inti ser tintalab tiegħu sehem f'dan l-istudju sabiex inkunu nafu aktar fuq l-esperjenza tiegħek dwar dan is-sugġett.

Jekk tixtieq tipparteċipa, inti tintalab timla kwestjonarju anonimu li jinvolvi mistoqsijiet dwar myHealth u l-fehmiet tiegħek dwar is-servizzi li jipprovdi. Id-data miġbura tingabar f'forma anonima. B'hekk mhux ser tinkixef l-identità tiegħek mit-tweġibiet li tkun provdejt, u fl-ebda punt mhu ser tintalab tikxef l-identità personali tiegħek. Barra minn hekk, id-data tinħażen b'mod sigur u tkun aċċessibbli biss għalija (ir-riċerkatur), is-superviżur tiegħi, u jekk ikun hemm bżonn, kwalunkwe eżaminatur(i) possibbli tal-proġett.

Il-parteċipazzjoni f'dan l-istudju hija għal kollox volontarja; fi kliem ieħor, inti liberu li taċċetta jew tirrifjuta li tipparteċipa, mingħajr ma jkollok bżonn tipprovdi raġuni. Int liberu wkoll li tirtira mill-istudju fi kwalunkwe ħin matul il-kwestjonarju billi tagħlaq il-kwestjonarju onlajn, mingħajr ma jkollok bżonn tipprovdi l-ebda spjegazzjoni u mingħajr riperkussjonijiet negattivi għalik. Mhux possibbli li jiġu mibdula t-tweġibiet jew irtirati

t-twegibiet sottomessi wara li jimtela l-kwestjonarju, peressli t-twegibiet jintbghatu b'mod anonimu.

Fl-ebda punt mhu ser tintalab tipprovdi ismek jew data personali oħra li tista' twassal biex tiġi identifikat. Barra minn hekk, tista' taqbez mistoqsija li ma tixtieqx twiegeb.

Jekk tixtieq tipparteċipa f'dan l-istudju, jekk jogħġbok aghfas fuq il-buttuna li tgħid "Naqbel li nipparteċipa". Jekk le, jekk jogħġbok aghlaq it-tieqa tal-browser (jew aghfas "Ma nixtieqx nipparteċipa").

Grazzi tal-hin u l-konsiderazzjoni tiegħek. Jekk għandek xi mistoqsijiet jew thassib, jekk jogħġbok ikkuntatjani b'email fuq katarina.bugeja.20@um.edu.mt, tista' wkoll tikkuntattja lis-superviżur tiegħi permezz tal-email: lilian.m.azzopardi@um.edu.mt

Dejjem tiegħek,

Katarina Maria Bugeja

katarina.bugeja.20@um.edu.mt

DECLARATION BY RESPONDENT: I hereby confirm that I am 18 years of age or older. I am aware that completing and submitting this anonymous questionnaire implies that I am participating voluntarily and with full informed consent on the conditions listed above.

DIKJARAZZJONI MILL-PARTEĊIPANT: B'dan nikkonferma li għandi 18 -il sena jew aktar. Jiena konxju li l-mili u s-sottomissjoni ta' dan il-kwestjonarju anonimu jimplika li qiegħed/ qegħdha nipparteċipa b'mod volontarju u b'kunsens infurmat sħiħ dwar il-kundizzjonijiet elenkati hawn fuq.

I agree to participate (Naqbel li nipparteċipa)-begin the survey

I do not wish to participate (Ma nixtieqx nipparteċipa)- exit the survey

1. Age

Eta'

- 18 to 25 (*18 sa 25*)
- 26 to 30 (*26 sa 30*)
- 31 to 40 (*31 sa 40*)
- 41 to 50 (*41 sa 50*)
- 51 to 60 (*51 sa 60*)
- 60+

2. Gender

Sess

- Male (*Raġel*)
- Female (*Mara*)
- Prefer not to say (*Nippreferi ma Nghix*)

3. Occupation

Professjoni

- Health Care Professional (*Professionist fil-kura tas-saħħa*)
- Other

4. Have you heard of myHealth?

Smajt dwar il-pjattaforma tal-myHealth?

Yes (*Iva*)

No (*Le*)

5. Do you know what services myHealth provides?

Taf liema servizzi tipprovdi myHealth?

Yes (*Iva*)

No (*Le*)

6. Have you used myHealth before?

Qatt użajt myHealth fil-passat?

Yes (*Iva*)

No (*Le*)

7. If you have used myHealth before, how simple was it to use?

Jekk użajt myHealth fil-passat, kemm kienet sempliċi biex tuża?

Simple (<i>Sempliċi</i>)				Very difficult (<i>Diffiċli ħafna</i>)
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8. Have you ever used myHealth to check your POYC (Pharmacy of Your Choice) entitlement?

Qatt użajt myHealth biex tiċċekkja l-intitolament tiegħek tal-POYC (Pharmacy of Your Choice)?

Yes (*Iva*)

No (*Le*)

I am not entitled to any POYC medication (*M'iniex intitolat/a għall-medicini fl-iskema tal-POYC*)

9. Do you believe your pharmacist should have access to your myHealth?

Temmen li l-ispizjar tiegħek għandu jkollu aċċess għall-myHealth tiegħek?

Yes

No

10. Please explain why you answered yes or no in the previous question.

Jekk jogħġbok spjega għaliex wegħibt iva jew le fil-mistoqsija preċedenti.

11. Have you ever showed your medical tests which are available on myHealth, to your pharmacist?

Ġieli urejt it-testijiet mediċi tiegħek, li huma disponibbli fuq myHealth, lill-ispizjar tiegħek?

Yes

No

12. Have you ever had your blood glucose or blood pressure taken by a pharmacist?

Qatt għamilt test taz-zokkor jew ħadt il-pressjoni għand l-ispizjar/a?

Yes

No

13. If yes, would you be willing to have the results added to myHealth for future reference?

Jekk iva, tkun interessat li r-rizultati jiġu miżjuda fuq myHealth fil-futur?

Yes

No

14. If you perform regular blood glucose and/or blood pressure testing, would you be willing to input the data into myHealth yourself as a record of self-testing?

Jekk tagħmel testijiet regolari għaz-zokkar u/jew tal-pressjoni, tkun lest li ddahħal l-informazzjoni f'myHealth bħala rekord għalik innifsek?

Yes

No

I do not perform regular self-monitoring *(Jien ma nagħmilx monitoraġġ tiegħi nnifsi fuq bażi regolari)*

15. Do you have any suggestions for ways to better the myHealth portal?

Għandek xi suggerimenti għall- modi kif jista' jittejjeb il-portal myHealth?
